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THE GARDENERS'

MAGAZINE OF BOTANY,

HORTICULTURE, FLORICULTURE,

And Natural Science.

CONDUCTED BY

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IN ENTOMOLOGY, BY J. O. WESTWOOD, F.L.S.;
IN NATURAL SCIENCE, BY J. STEVENSON BUSHNAN, M.D.;
IN FLORICULTURE, BY MR. BARNES, DANE CROFT NURSERIES, STOWMARKET;
AND IN JUDGING FLORISTS' FLOWERS, BY MR. GEORGE GLENNY, F.H.S.

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PREFACE.

WE heartily respect the good old customs of those who have gone before us; and as one of them consisted in paying, at the close of a periodical volume, a grateful tribute to the friends who had supported it, we prefer not to turn from the good old ways. Therefore, we tender to one and all of those who have in any way—whether as subscribers, contributors, or otherwise—supported "The Gardeners' Magazine of Botany," our cordial thanks for the encouraging support by means of which we have proceeded thus far in our course; and this aid, while enabling us to complete our first volume, under cordial assurance of approbation, inspires also the fullest confidence as to the future.

On commencing our labours we took occasion to state, that it was not on any efforts or abilities of our own that we depended for the position which this *Magazine* should assume in the ranks of Horticultural Literature; but rather on the hearty promises of support we received from many of the best practical gardeners of this country. We may now add, that the measure of success to which we have attained is mainly attributable to the realization of these promises; by that realization we have been enabled to present periodically a large amount of information, at once sound, practical, and interesting.

To the friends and patrons, then, of "The Gardeners' Magazine of Botany," we present the humble tribute of our grateful thanks; and in an especial manner we would offer our acknowledgments to those who have kindly permitted us to make drawings of their new or otherwise interesting plants for publication; whilst to all who take an interest in the advancement of the art of Gardening, we freely offer the hand of fellowship, and the olive-branch of peace.

One word more. Those who wish to serve us cannot do so more effectually than in making the *Magazine* known among their friends, impressing upon them, at the same time, that it is not a book for the learned alone, but calculated to instruct learners as well as adepts in the art and science of Horticulture.

London, *June*, 1850.

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*** *d.* described; *f.* figured.

ERRATA.

P. 2, *for* "Berlin," *read* "Vienna."

P. 94, *for* "B. deprissa," *read* "P. depressa."

The Gardener's Magazine of Botany

THE discontinuance of Paxton's Magazine of Botany has made a vacancy in Floricultural Literature, which it has been determined to fill up by the publication of a somewhat similar work—The Gardener's Magazine of Botany, whose origin is thus sufficiently explained Its objects we shall now briefly enumerate.

The Gardeners' Magazine of Botany is intended to be a guide to the Practical Gardener in the various operations of his art. It also professes to teach Lady or Gentlemen Amateurs in the art of designing, laying out, selecting, and planting gardens and pleasure-grounds—in the erection and heating of horticultural buildings—and in the general management of gardens and plantations. Every fact connected with the progress of science, illustrative or elucidatory of practical gardening, will be duly registered as an aid to the cultivator. New popular flowers, fruits, and vegetables will be recorded, described, and, where necessary, illustrated; and new varieties of popular flowers will be critically noticed by competent judges. *The Gardeners' Magazine of Botany* is thus designed to become a Miscellany of useful and interesting information on every branch of horticultural science. "Science with Practice," is to be its motto.

The objects thus briefly sketched are comprehensive in their character; and in the attainment of them the Conductors rely not so much upon themselves, as on the prompt assistance and promises of support they have received from many of the first cultivators of the day; and from other eminent writers in those departments of science—Phytology, Chemistry, Entomology, &c.—which bear on Horticulture in its various branches. To this support must be attributed whatever merit may be attained.

Among the many advantages conferred upon the sciences of Horticulture and Botany by the late Mr. Loudon, it was not the least of his merits that he opened the pages of his Magazine as a medium through which Observers might record the results of their investigations in Natural History, Gardening, and Botany. Since the discontinuance of his Magazine, no

other Gardening Publication has adopted the same course; and *The Gardeners' Magazine of Botany* will thus supply a positive desideratum in opening a portion of its pages to such communications. Clergymen of our venerated Church, and Medical men who possess professionally the advantage of an university training to habits of observation, as well as Gardeners, and Garden Amateurs, are invited to co-operation.

One word more—If there be those who look upon *The Gardeners' Magazine of Botany* as a rival or opponent of any previously-existing, or simultaneously-announced gardening publication, we would assure them that no such feelings are entertained by the Conductors, or by the Publishers, who, occupying ground which has been abandoned by others, and which may, therefore, in all fairness, be maintained by themselves,—have determined on "Friendly co-operation with ALL," in the one great object of all—the advancement of the Science of Gardening.

With these few remarks we proceed to present the reader with a few suggestions from a valued friend and contributor, Mr. D. Beaton, of Shrubland Park, being extracts from a letter in the form of an address to the conductors:—

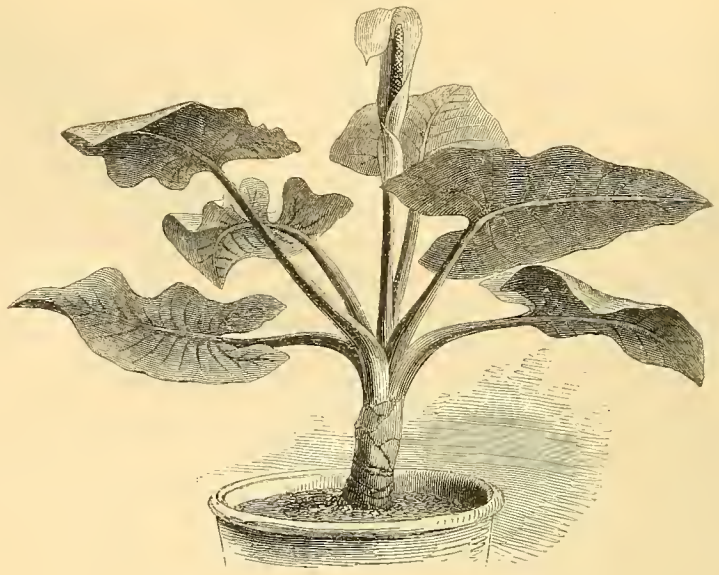
"I REJOICE to learn that you have taken the helm of a successor to the good old cruizer, which, for so many years, conveyed very pleasant and useful instructions, under the able and amiable guidance of our worthy fellow-labourer, Mr. Paxton. I trust you will meet with ample encouragement from men of your own practical standing, and that contributions to all the departments of the work will pour in upon you from week to week. A weekly Magazine will be a great novelty at first; you must not, however, trust to the charms of novelty for success in the undertaking, but rather to the amount of sound practical information which you will be able to furnish to your readers. If you leave affectation, bombast, and wrangling to softer heads, and rely on the hearty co-operation of respectable gardeners in your own circle, you cannot fail of success. Plain common sense, conveyed in simple language, is what is now found to gain the ear of the great body of the people who are seeking after useful knowledge, as is abundantly exemplified in the great success of the *Cottage Gardener*—humble as its pretensions have been from the first. In your higher flight you may well calculate on the assistance of many good gardeners, who would, no doubt, think it beneath their station to sit down to write the simplest elements of their art for the information of the million, as we now are doing in the *Cottage Gardener*—for I too belong to the staff engaged on that useful work.

"In promising you what little assistance I can afford from time to time, I may as well tell you at the outset, that I shall often have to appear in your pages seeking information for myself, from one of yourselves. I allude more particularly to the fascinating tribe of Ferns, which is now becoming more and more fashionable, and deservedly so, every year. I look upon it as a fortunate circumstance, and as indicating the utilitarian tendency of our day, that the services of an author as editor, who has already earned his laurels among the Ferns, has been obtained by the proprietors of this work as co-editor with another who, we all know, is a host in himself. And I congratulate your readers in having thus a ready access to sound information on all topics that relate to Ferns particularly, of which it is said by Humboldt, on the authority of Professor Kunze, of Leipsic ("Aspects of Nature," vol. ii., p. 188), that more than three thousand species are already known or described. It is further stated by this illustrious philosopher, who is deeply versed in the geographical distribution of plants, that many more of them are yet confidently expected to enrich our collections. He says, in the work referred to, that we are still "completely unacquainted with the larger portions of the interior of South America, (Mato-Grosso, Paraguay, the eastern declivity of the Andes, Santa Cruz de la Sierra, and all the countries between the Orinocco, the Rio Negro, the Amazons, and Puruz), of Africa, Madagascar, Borneo, and Central and Eastern Asia, with the interior of Australia;" and he remarks, that "the thought rises involuntarily in the mind, that we may not yet know the third, or probably even the fifth part of the plants existing on the earth." And yet he tells us that seventy-four thousand species of plants are preserved in the Royal Herbarium at Schönbrunn, near Berlin;—nearly three times the number of flowering plants enumerated in Loudon's "Hortus Britannicus." We may, therefore, reasonably conclude, that a large accession to our present knowledge of Ferns must accrue from the share they must occupy of these unexplored regions, although the numerical proportions of the existing divisions of the vegetable kingdom are not yet well determined. But instead of thus speculating on a future supply of materials to enrich your pages, let me rather recommend to such of your readers as may have a turn for curious experiments, to try the following, which I have proposed to

investigate myself next spring. It is one step in a series of experiments which I undertook some years since, with a view to determine, if possible, the true origin of the so-called purple laburnum. Some of these experiments, and the deductions I have drawn from them, I propose, with your leave, to lay before your readers as my time and inclination may dictate. In the meantime, I suggest the following

PHYTOLOGICAL EXPERIMENT,

which any one having the convenience of a cucumber-bed, will be enabled to perform, and prove, in a single season, or, at any rate, in the course of a second growth; and the more hands we have in the field, the sooner, or, at least, the more surely, can we determine the point sought to be established, which is this—to ascertain if it be possible to cause the callosities formed by two cuttings to amalgamate or mix together during their formation; and, if so, whether an adventitious bud, formed on the united mass, will be enabled to partake of the properties of the two plants from which the cuttings were made. Without hazarding an opinion as to the issue of such an experiment, I shall conclude by merely describing the most likely way of arriving at a satisfactory conclusion. Make choice of two distinct kinds of Gloxinia, and take a leaf of each, carrying the whole of the footstalk or petiole; graft the two footstalks together, by first cutting off a portion from one side of each, say to the length of a couple of inches, and, leaving the bottom parts quite thin, in the form of a half wedge, or the bottom of an apple-shoot cut for whip or tongue grafting; bind the me carefully together, leaving a short space at the bottom free to facilitate the emission of roots, but take especial care that the bottom points are held closely together. Now, as it is well known that such leaves will soon form tubers when put in as cuttings, we may easily conceive it possible for two of them thus united to produce but one bulb or tuber; and if so, is it not very reasonable to believe that a bud or buds issuing from such a tuber would inherit the properties of the two parent plants from which the leaves were cut? It may be necessary to remark, for the guidance of the uninitiated, that the leaves for this purpose must not be cut too close to the stem of the plant for fear of carrying with it the natural buds, so to speak. Whether a tuber formed by a leaf-cutting is fed more from one side of the footstalk or not, has not been recorded, if even ascertained; therefore it may be as well to join a pair back to back, and another pair with the front of the leaves facing each other. Although this difference in the position of the parts may appear to some to be a mere trifle, I have known a less important cause to derange a whole set of experiments for twelve months.



COLOCASIA ODORATA.

THE fragrance of this species renders it a desirable subject in all collections of stove plants. The diffused odour, as it pervades the entire atmosphere of a hot house in which the plant is blooming, resembles that of Mignonette; but the more powerful and concentrated fragrance which is experienced on nearer contact with the plant, is of the sweet aromatic nature of that of some Orchids. The Colocasia odorata is not a novel plant, but it is not common. It is one of the arborescent aroideous plants, which give such a tropical air to collections in which they occur. This species grows with a caudex of three to six feet high, and from four to six inches in diameter, and is then crowned at the top with a head of large narrowly cordate leaves, supported on long stout footstalks, and traversed by prominent veins. The flowers grow from the axils of the leaves towards the centre of the plant, and stand erect among the foliage. The spathe is about a span long, contracted below the middle, and then expanding into a concave or boat-shaped membrane, which, at first, stands erect, encircling the spadix, but ultimately bends over it like a hood. The spathe is green at first, but acquires a yellowish hue when at maturity. The spadix is club-shaped, and shorter than the spathe.

The foliage of the Colocasia is the seat of a waxy secretion, which, though scanty in the plants cultivated in our hot-houses, is yet produced in considerable quantities, when the plant is growing in its natural climate. The secretion is formed exclusively on the lower face of the leaf, and is confined to the axils of its principal nerves, where the cellular tissue produces it, and from which points, this waxy substance extends sometimes over nearly the whole inferior surface of the foliage. In the cultivated plant it only exists in small scales, at the utmost not larger than the human nail.*

A curious property possessed by the plants of this family, is the evolution of heat at certain periods of their inflorescence. This has been noticed by various observers, but apparently first by Lamarck, who, in 1777, made the discovery upon Arum italicum. The most exact experiments, however, are those of M. Adolphe Brogniart, made in 1834, upon a plant of the Colocasia odorata, which developed four flowers in the space of a month.

"The first flower began to expand on the 4th of March, but it was not till the 6th that the escape of pollen from its anthers commenced, and the increase of temperature on the spadix was perceptible to the touch. A very small thermometer, when applied to the flower, indicated a temperature in the air of 23 degrees centrigrade, while the spadix, close to the fertile stamens, was 26 degrees, and the club formed by the abortive stamens was 30 degrees, the difference being 7 degrees. The heat of the flower gradually diminished, and, in the evening, its temperature was the same as that of the stove. It is remarkable, however, that, while all the other Aroideæ that have been examined on this point, appear,—when the heat has once disappeared,—never to regain it, the plant under consideration exhibited the same increase of temperature at the same hour (2 p.m.) of the following day, and for four days it

* *Botanical Magazine*, t. 3935.

continued, though with gradually diminishing intensity, to present a similar phenomenon, when the flower finally faded.

"Another blossom having appeared shortly after, I adopted many precautions which should enable me to watch its progress. I procured a very delicate thermometer, applied it accurately to the most sensible parts of the flower; and protected the bulb by folds of flannel from the influence of the circumambient atmosphere, and by a purple shade from the rays of the sun. Another thermometer was suspended in the stove, not far from the plant, to give the temperature of the stove. For six days a striking increase of heat took place in the flower, attaining its maximum about 4 p.m., and totally ceasing during the night and early morning. The greatest difference between the temperature of the flower, and the general atmosphere of the stove, was 11 degrees; and, as in the first blossom examined, so the central portion of the club of abortive stamens, was the part which exhibited the heat most powerfully; next the base of that club, and then the stamens which were fertile."*

The Colocasia odorata is a native of Pegu; is a free-growing plant under cultivation, and requires plenty of room both for its roots and leaves; the latter, indeed, it is which gives to the plant its truly noble aspect.

* *Nouv. Ann. de Museum, d'Hist. Nat.*, vol. iii

ON THE CULTIVATION OF FANCY PELARGONIUMS.

By Mr. HENRY ROSIER, Brookland's Nursery, Blackheath.

THE class of fancy Pelargoniums having now become almost universal favourites, a few remarks on their cultivation may not be out of place. It is but a few years since we had only Queen Victoria, raised by Mr. Sheppard, of Winchester, with a continental variety or two, such as Jehu, Anais, Ibrahim Pacha, &c.; all of which are very pretty, and reflect great credit on our continental brethren, who are ever on the alert to produce novelties; but these are now surpassed by the indefatigable perseverance and skill of our English florists, who, within the last year or two, have been most assiduous in hybridising, and have produced many first-rate and showy varieties. We are much indebted to Mr. Ambrose, and also to Mr. Gaines, of Battersea, for many of the best which were most creditably shown by those gentlemen last season. That these flowers will long continue to be favourites, I think there cannot be any doubt, as, if properly managed, they will continue to flower throughout the whole year, imparting, with their hundreds of gay, many-coloured blossoms, a charming and most lively appearance to the greenhouse through the dreary winter months.

There are several kinds which deserve especial notice for these properties, such as Jenny Lind (Ambrose's), Anais, Fairy Queen (Ambrose's), Alboni (Henderson's), Lady Rivers, &c.; though, I doubt not, the whole of the varieties in cultivation would do so under proper management. Quercifolia superba, a bright scarlet-flowered, oak-leaved variety, deserves a place in every collection, however select, being most desirable, either for the bouquet or flower-garden, for which it is admirably adapted; as, indeed, are most of the other varieties, being of dwarf habit and most profuse bloomers. It is my opinion, from the practice I have had in hybridising, that there is yet a wide field open for the florist to work in, by crossing the Cape varieties with the fancy ones, as many of the Cape species are rich in their colours, and varied in their foliage.

There was a very singular hybrid exhibited last season at the Horticultural Society's Garden at Chiswick, under the name of Ambrosiana, said to be a cross between Campylea laciniata and a fancy variety, probably Anais, and to which was awarded a silver medal, as a new and distinct variety. Let us, then, hope, that enterprising florists will take them in hand, and give us more novelties.

In conclusion, I would offer a few remarks on the growth and winter flowering of these plants. Should they be required for exhibition, it is necessary that strong plants should be selected to grow through the following season. When once started for this purpose, great care should be taken in potting from one sized pot to another, as soon as the pot is full of roots; and to encourage free growth, a rich soil is indispensable. I have found the following mixture answer well:—

Two barrows of good turfy loam;—Epping I have found the best.

One barrow of leaf mould.

One ditto of well-decomposed cow-dung, with a good portion of silver sand.

Drain well with potsherds broken small, and charcoal in moderate-sized pieces. After a summer's free

growth, it is necessary, about the beginning of July, to diminish the quantity of water previously necessary, so that the wood may be thoroughly hardened before cutting down. Some of the varieties do not require any cutting down at all—as, I find, Anais, Ibrahim Pacha, and some others of the more slender-growing kinds, do best by pulling out the flower-buds in the autumn, leaving them to grow on. By the end of July the plants will require to be shaken clean out of the soil, to have the roots prnned a little at the points, previous to repotting. When autumn flowering-plants are required, I find that cuttings, taken in the early summer months, when they strike freely, make nice compact plants, and flower through the autumn and early winter months. As the season advances, it is necessary to give them a little warmth to make them expand their blossoms freely. In putting in the cuttings, I find it requisite to fill the pots about half full of broken potsherds, as they are susceptible of damp, which is very injurious to them. The compost I have found them to do best in for winter flowering, is equal parts of good turfy loam, peat, well decomposed cow-dung, and leaf-mould, with a good portion of silver sand,—always taking care to drain the pots properly.

Below will be found a few varieties enumerated, with an asterisk attached to the most beautiful:—

Alboni (Henderson).	Empress.	Lady Rivers.	Ne plus ultra (Gaines).
Anais.	*Fairy Queen (Ambrose).	Madame Miclez.	*Picturata (Ambrose).
*Beauty (Ambrose).	*Formosa (Ambrose).	Madame Rosati (Gaines).	Queen Superb (Ambrose).
——— Supreme.	Garland (Ambrose).	*Magnifica (Ambrose).	*Reine des Français.
Bouquet Tout Fait.	*Hero of Surrey (Gaines).	Mazeppa Superb.	*Statiaski.
Defiance (Ambrose).	Jenny Lind (Ambrose).	Minerva (Ambrose).	Village Maid.
Duchesse d'Aumale.	La Belle d'Afrique.	Modesta (Ambrose).	Zebra.

WILD-FLOWERS—A Sketch Introductory.

FLOWERS! Wild-flowers—whence come they? What are they? Whither, in pursuit of them, do they invite us? They are the children of the sun. They are the stars of the earth. They are redolent of beauty. Whence come they? Ask whence comes the light of heaven, which sends forth the "rainbow issuing from its cloudy shrine," to stretch its iris over vale and mountain, lake and stream, illuminating, with its azure hues, all objects 'neath its bold triumphal arch! Ask, whence comes the majesty of the dim umbrageous forests, never yet explored by foot of man! or, whence the charm of those "dim secluded vales," in which the forlorn nightingale pours forth her solitary, self-taught song—

> "Singing love to her lone mate,
> In the ivy bower disconsolate!"

Ask, whence come Wild-flowers! It was not decreed that man should "live, and move, and have his being" upon a bare, a barren, and impenetrable rocky surface. A higher destiny awaited him. The earth was appointed as a temple for the adoration of the Supreme Being; the air became soft, and balmy, and translucent; the firmament above revealed the clustering glory of an infinitude of stars—worlds unknown, progressing through infinite space—which he gazed upon with eyes "made up of wonder and of love;" while beneath his footsteps a fragrant verdure of extended wild-flowers sprung into existence. Stars above! Wild-flowers beneath! But what are they? They are the most delicate links in the chain of causation—connecting media of sympathy. True it is that a premature frost, a cold and icy mountain-blast, may wither a fairy group of them; but still they are sustained—still live to reappear and bless our wondering sight.

The blossoms of our much-loved Wild-flowers, it is true, are oftentimes so delicate, so small, as to escape our ken. But are they less beautiful than those of larger growth? Far from it! But what is a Wild-flower? It is that simple and unheeded little plant which grows indigenous in its native soil. The wind planteth its seed where it listeth; and there, unseen by any human eye, it springs into ephemeral existence, and fades too soon in the shadow of its own loveliness. Compare the wild with the exotic flower:—the one

> "In shoals and bands, a morrice train,
> Will meet the traveller in the lane;"

but for the other—the exotic flower, we must enter the green-house, or the highly cultivated garden. The specimens we there find may be exquisite, and fully do we admire them, and appreciate their loveliness; and much regard have we for the careful hand that trained them. But they do not carry any impression home to the heart like the simple Wild-flower that springs directly from the

bosom of Nature, needing no adventitious aid or care to protect and perfect its development. Who would compare the song of the Robin or the Linnet, the Blackbird or the Thrush, or any of our forest birds, "warbling their native wood-notes wild," with the domesticated cage-birds from foreign climes? Not that we by any means undervalue them. No imprisonment can eradicate the principle which Nature has implanted in the heart. Hence Wordsworth, in that charming poem addressed to liberty—which, we imagine, every true poet knows by heart—asks:—

"Who can divine what impulses of God
Reach the caged Lark within his town abode,
From his poor inch or two of daisied sod?
Oh, yield him back his privilege! No sea
Swells like the bosom of a man set free!—
A wilderness is rich with liberty!"

And it is this very mountain air of liberty which throws a charm over those Wild-flowers which have been so frequently deified in the poet's song.

But whither will the pursuit of them lead us? Truly, beyond the smoke and din of busy capitals, and even the hum of distant villages. Wild-flowers seem to love solitude and shade; and oftentimes tempt us into obscure and almost inaccessible spots. Nevertheless, they spring up everywhere. They may be seen enamelling the green sward which surrounds the aristocratic mansion; but they shine not less sweetly under the little hedge-row which bounds the garden of the lowly husbandman. They may be seen straggling within the clefts of sea-girt rocks, and trembling by the side of roaring waterfalls; —but they bloom not less abundantly along the banks of "the mill-stream that melts along the lea." They invite also more serious and melancholy associations. They may be observed glistening through the ivy-leaves, on the top of many a ruined tower; and they spring up almost suddenly, and with supernatural quickness, amid the blades of grass upon every newly-raised and virgin grave:—

"Lay her in the earth,
And from her fair and unpolluted flesh
May violets spring!"

exclaims Laertes over the grave of poor Ophelia. Furthermore be it observed, that the most simple and humble of our Wild-flowers are protected by the same Omnipotent hand which "tempers the wind to the shorn lamb." They are born, they live, they fade away, and so fulfil their destiny:—

"The reckless shower
That weighs too heavily upon the Lily's silver head,
Still leaves a saving moisture at its roots,"

and it revives. Its simple resuscitation is an affecting type of the immortality of man.

Again, what happy, serene, and blessed thoughts may not Wild-flowers suggest? The unthinking, the unfeeling, the uneducated—humanity's dull clowns—may pass them heedlessly by, or gaze unconsciously upon them, as they trample them in the dust:—

"A Primrose by the river's brim,
A simple Primrose was to him,
And it was nothing more;"

but, to the spiritual eye, they reveal deeper meanings, which throw a peculiar colouring o'er the past, the present, and the future. One of our most amiable and sensitive of modern poets, who familiarised his youthful mind, and fervently sympathised with the beauties of nature, and who died, unhappily, before the star of his genius may be said to have risen in the ascendant—Keats—was a devoted lover of Wild-flowers. In his life, recently published by Monckton Miles—a charming volume, which cannot be read otherwise than with intense interest, by all true lovers of poetry—we are informed that the young poet told his friend Severn, that "he thought the intensest pleasure he had received in life, was in watching the growth of flowers;" and, another time, after lying awhile, still and peaceful, on his last sick-bed, he said, "I feel the flowers growing over me;" and "there they do grow," adds his biographer, "even all the winter long, Violets and Daisies mingling with the herbage; and, in the words of Shelley, "making us in love with death, to think that one should be buried in so sweet a place." But Wild-flowers suggest not only melancholy thoughts, albeit, there may in such "be found a power to virtue friendly." They come forth as graceful hand-maidens of the Spring; they deck with wreaths of purity the brow of innocence, and diadem the bride. Flowers! Wild-flowers! let us love and cherish them; not only for the sake of their own sweet fragrance and simple beauty, but because they are suggestive of thoughts and feelings which lead us onwards and upwards, and wind associations

round our hearts, which, from the cradle to the grave, endear us to one another, and to Nature herself, and impress upon us the solemn conviction, that "all that we behold is full of blessings."

Reader, forgive these words—wild as our flowers. They merely tell you of our love, and they flow from the heart. Anon we will address you, not less truthfully, but more practically.

ON THE OXALIS BOWEANA AS A BEDDING-PLANT.

By Mr. JOHN COX, Gardener to — Wells, Esq., Redleaf, Kent.

THE culture of plants, for the purpose of planting out in beds for decorating the flower-garden during summer and the autumn, has, of late years, formed a prominent feature in the gardener's routine of operations; and, as it may not be generally known that the Oxalis Boweana forms one of the most desirable plants, of any that we possess, for a dwarf bed, I am induced to offer a few remarks on its preparation for that purpose, being convinced that any one who may feel disposed to give it a trial will not be disappointed. The foliage itself is peculiarly beautiful; and the delicate pink blossoms, under judicious treatment, are produced in great profusion until destroyed by the frost.

At any time during the latter end of the present month, or the first week in the next, select the finest tubers, and pot them singly into four-inch pots, in a mixture of three parts sandy loam and leaf mould, and one part peat, draining the pots well, and putting a little moss over the drainage. The pots should then be placed in a frame with a moderate bottom-heat, and a temperature ranging about 60 degrees; or, if there is not that convenience, they may be placed in the early vinery, or any structure where a regular temperature not lower than the above is maintained. They will be a long time in producing their foliage, and, until they do so, they must not be supplied with more water than will suffice to keep the soil in a moderately moist state, but little removed from dryness. As the season advances, and the pots become filled with fibres, they will require more. When the foliage appears, let them be placed near the glass to prevent drawing; and, as the growth proceeds, treat them, occasionally, with a little clear diluted manure water.

Having got the plants well up, heat is no longer necessary; and the next consideration is, to inure them, gradually, to bear the open air, which may be done by removing them, first, to a shelf in the greenhouse near the glass, and, eventually, to a cold frame or pit, giving abundance of air, and a free exposure in favourable weather.

The last week in May, or first in June, is the time to plant them in the bed, which should have been previously prepared for the purpose, by draining, if not previously well-drained, and by receiving a compost of the above-described soil. It should be situated in a sheltered place, but exposed to the sun. The plants should be planted quincunx fashion, at a distance not exceeding a foot apart. The soil, after planting, will require to be stirred occasionally; and seasonable applications of clear liquid manure will produce abundant luxuriant foliage, and large flowers. I do not doubt but that, upon trial, it will be considered a desirable acquisition.

1 Passiflora Belottii

2 Maurandya Barclayana var rosea

PASSIFLORA BELOTTII.

Nat. Order, Passifloraceæ.——Passion Worts. (*Lindley's Veg. Kingdom.*)

Generic Character.—Calyx five-sepalled, tube very short, throat ornamented with a multiple filamentous coronet. *Petals* five or wanting. *Stamens* five (or four). *Ovarium* stalked. *Berry* usually pulpy, rarely membranous.

Passiflora Belottii.—Belotti's Passion-flower.—A garden hybrid, apparently raised between *P. edulis* and *P. quadrangularis*, or *P. Buonapartea*.

DESCRIPTION.—A very robust-growing climbing shrub. Stems round tendrilled. Leaves large, alternate, glabrous, deeply three-lobed, the lobes acuminate, or ovato-acuminate, entire. Flowers large and showy; sepals flesh-coloured, tinged with green; petals delicate light rose colour; rays of the coronet blue with indistinct purple transverse bars.

History, &c.—This fine hybrid Passion-flower was received, about three years ago, from the Jardin des Plantes at Paris, by Messrs. Knight and Perry, Exotic Nursery, Chelsea. We have no exact information of its origin, but it is obviously a hybrid production, and most probably originated from one or other of the species mentioned above. It is a very handsome plant, deserving of general cultivation; a vigorous grower, blooming freely during the summer months. It has some resemblance to P. quadrangularis in its habit of flowering, and in some respects in its foliage, which has the peculiarity of being sometimes simple, undivided, and sometimes deeply lobed. The foliage is indeed very variable in character—sometimes without division—sometimes deeply divided into three acuminate lobes—and occasionally sporting into intermediate forms, one or other of the lobes being more or less suppressed.

Culture.—It is said to grow freely in a warm greenhouse, but probably a cool stove or intermediate house would be a more suitable permanent situation for it. Like the other vigorous growing kinds, it requires ample scope for its roots, in a rough, open, rich, loamy compost, to encourage strong growth preparatory to its blossoming, which takes place when the growth becomes somewhat arrested from the roots having partially exhausted the feeding properties of the soil. It is propagated readily by cuttings, planted in sandy soil, and kept close, with a slight bottom heat.

The generic name, Passiflora, has been applied to this family of plants, on account of the appendages of the flowers having some supposed resemblance to the symbols of the passion of our Saviour.

MAURANDYA BARCLAYANA, Var. Rosea.

Nat. Order, Scrophulariaceæ, ♀ Antirrhineæ.——Linariads.——(*Lindley's Œconom. Bot.*)

Generic Character.—*Calyx* five-parted. *Corolla* personate, tube obscurely tetragonal; saccate at the base; ventricose downwards; upper lip erect, lower spreading, lobes roundish or ovate; palate closing the throat, or filled by two plicæ. *Stamens* four fertile, didynamous, with a rudiment of a fifth; filaments villous at the base and dilated. *Ovarium* ovoid; style subulate; stigma obtuse emarginate. *Capsule* ovate globose, oblique at the base, compressed membranous, dehiscing by ten teeth at the apex.

Maurandya Barclayana, Lindley.—Barclay's Maurandya.—Leaves cordate-acuminate, young ones somewhat hastate; segments calycine linear lanceolate, very acute, clothed with glandular hairs.

M. Barclayana var. rosea: flowers bright rose coloured.

DESCRIPTION.—A very elegant climbing perennial herb; stems slender, and, as well as the leaves, glabrous, branched, climbing by means of the petioles of the leaves, which act as tendrils. Leaves, alternate cordate-acuminate, bright green; lower and middle leaves, obscurely five-lobed, the lobes acuminate. Flowers two inches long, the tube pale red; limb, of a bright rose colour, paler in the throat, the lobes ovate roundish emarginate.

History, &c.—A very showy variety of the purple Maurandya Barclayana, which is readily distinguished from the other species by the glandular hairy calyx. It is a seedling variation, which has been known in gardens for some few years past, but has not been so generally cultivated as its merits deserve. It is sometimes called Maurandya lucida, but is now better known by the name we have adopted.

Culture.—The Maurandyas are among the most beautiful of the free-growing climbing plants, suitable either for the greenhouse, or for cultivating in the open garden during summer as climbing annuals. The seed sown early in the spring, and nursed in frames, and then planted out after danger from frost is past, become beautiful objects during the latter part of the summer months; or, if raised the previous autumn, and wintered in a greenhouse, they may be planted out almost in blossom in the following June. They usually mature abundance of seed.

The genus Maurandya was dedicated in honour of Dr. Maurandy, who was Professor of Botany at Carthagena.

ON THE CULTIVATION OF IXORA GRANDIFLORA.

By Mr. W. TAYLOR, Gardener to J. Coster, Esq., Streatham.

HAVING for some time cultivated this beautiful stove shrub with success, I am induced to bring it before your readers, with a hope that its cultivation may receive more attention.

It appears to have been introduced to this country from the East Indies about 1814, but its value as a first-class stove-plant, for all purposes of decoration, has not been known until of late years, when public competition at the various horticultural exhibitions, discovered it to be one of the brightest gems of the stove; its beautiful glossy foliage contrasting admirably with the large heads of bright, scarlet flowers, which, by good management, may be produced from May until October.

In order to make my remarks understood by all whom it is intended to instruct, I will commence with the young plant from the nursery. In the first place, it is indispensably necessary that the plants should be chosen from a clean stock, as upon this will depend, in a great measure, the success of the cultivator; for, as the Ixora is a favourite with the mealy-bug and scale, it is necessary to keep watch upon the young plants, as the scale, or bug, once established, it will be almost impossible to eradicate them when the plants become large.

The month of March will be a good season to commence. To insure a free and healthy growth, the roots must be examined, and, if they reach the side of the pot, the plant should be shifted into another two sizes larger, as they are very free rooting plants when kept in a healthy condition. The soil I use is a light turfy peat, well broken up, and mixed with sand, a quantity of broken potsherds and lumps of charcoal, and the pots must be well drained to insure a healthy circulation of air and water. If there is a pit, worked with dung linings, or a frame and dung bed at work, with a bottom heat of 75 degrees, I plunge the pot, one-third of its depth, in tan, cinder ashes, or saw-dust, at a distance of not more than six inches from the glass; for, by keeping the plants near the light, a more robust and healthy development is induced, the wood also will be short-jointed and the leaves stiff and broad—conditions essential to the proper formation of a specimen of superior quality. If the weather is fine and sunny, the syringe may be used freely, but air should be admitted early, to dry the plants gradually, before the scorching sun reaches them, otherwise they will be liable to scald, which injures the plant, and also makes it unsightly. When the temperature rises above 75 degrees, air must be given freely, and this will remove the necessity of much shading, as the air hardens the texture of the leaves; and prevents them from scorching. If shading is once applied, it must not be discontinued without great caution, as a sudden burst of sunshine may do irreparable injury.

If the plant has only a single stem, it must be cut back, to induce the bottom eyes to break freely; but if there are two or three shoots, it is better to let them grow a considerable length without stopping, as that causes a more healthy development of roots. When the shoots are about a foot in length, and appear moderately ripe, and firm, they should be tied out, close to the surface of the soil in the pots, and the points of the shoots pinched out, to induce them to break from the collar of the plant, and likewise from the more vertical buds. If they require a second shift, this will be best done, when the eyes have started, which will cause a vigorous growth. I do not shift after the end of August, as the pot should be well filled with roots before the dark days of winter set in, although the plants, if healthy, will not entirely cease growing throughout the winter. The supply of moisture, at this season, particularly the atmospheric, must be gradually diminished, in order to bring the plants as near as possible to a state of rest; but a slight bottom heat, say about 60 degrees, with an atmospheric heat from 45 to 60 degrees, must be maintained. If the plants can be placed in a house or pit, heated by hot water or a flue, they will be more under control and less likely to be injured by damp. It is particularly

necessary that water be judiciously supplied, not dribbled out every day; but when they are really in want of water, they should have sufficient to saturate the ball of earth in every part.

If the first season's growth has been skilfully managed, the first week in February will be a good time to examine the plants, to see if they are all right and free from insects; for, if any appear, this will be a good time to clean them, as the wood and foliage being firm, it is less susceptible of injury than at any other season. Each plant should be taken separately, and laid upon a clean mat, supported by two bricks, and well syringed with water heated to 60 degrees, turning the plant round so as to get at the underside of every leaf; and this will rid them of scale and every other pest. The plant should then be regulated, shortening the shoots to two or three joints, and tying them out at regular distances, to admit as much light and air as possible amongst the branches. Observe the same rules for general treatment as in the first season.

When the specimen is large enough for the purpose it is intended to serve, the stopping must be discontinued, and the plant exposed to all the light and sun possible. If it shows bloom before September, and the flowers are not required before the month of May, must be pinched out about the middle of September, which will induce the plant to break from the lower buds, and in most cases show bloom on short-jointed wood. By admitting air night and day, the flowers will grow slowly through the winter; but, to prevent them from being injured by damp, it is indispensable to keep a rather dry atmosphere. As the spring advances, heat, and moisture, must be increased, and on sunny days a slight syringing with tepid water once a-day, will greatly benefit the plants. When the flowers begin to expand, water with the syringe must be dispensed with, but give plenty of air, as with a dry atmosphere, the season of blooming may be considerably prolonged, and the Ixora will form a beautiful object for all purposes of decoration, either for the conservatory or drawing-room.

It will be seen by the foregoing remarks, that there are four things especially to be observed in the successful cultivation of Ixoras, *first*, clean healthy plants; *second*, free, light, sandy peat soil, with abundance of drainage; *third*, gentle bottom heat at all seasons; *fourth*, as much light and air as possible at all seasons.

ON DESTROYING THE GOOSEBERRY CATERPILLAR.

By Mr. H. C. OGLE, Gardener to the Earl of Abergavenny, Eridge Castle, Tunbridge Wells.

AMONG the many annoyances to which a gardener is liable, that of insects injurious to fruit-trees and vegetation generally, is certainly not the least. The great number of communications which have been published during the last twenty-five years relative to their destruction, might lead some persons to suppose that they had but to adopt the means recommended by the various writers for their extirpation to ensure success. That many persons have been disappointed in their expectations, I have no doubt. In some instances, I believe, this arises from mismanagement, or inattention in applying the remedy as recommended; but I also know, that in many others it arises from the total inefficiency of the means devised. Gardeners, like others of their fellow-men, too frequently jump to conclusions—they do not sufficiently examine "cause and effect" in their experiments and practice—they send forth to the world premature conjectures; and although they may afterwards find out their error, few have the courage or disposition to correct it through the channel in which it could be of service, and to guard others from falling into the error which they have promulgated.

The preceding observations, I considered, might not be out of place in writing on the Gooseberry Caterpillar. There are several species which attack this fruit-shrub; but I have found none so troublesome as the caterpillar of a species of saw-fly (*Nematis ribesii*). Now, there are a great number of popular remedies for the destruction of this caterpillar; but, after having tried, or seen tried, most, or all of these, I confess I have little faith in either of them. It is a generally recognised principle, that prevention is better than cure; and in this case, I am sure, it is particularly applicable. My plan of carrying out this principle may not be new to many; but, after ten years' experience, I am quite satisfied it is effectual. My mode of proceeding is this:—In the autumn or winter, at the time of digging between the bushes, I have *fresh slacked lime* sown over the whole of the ground with a liberal hand, more particularly round the stems, and about the roots of the bushes. The ground is then forked over. About the middle or latter end of March, I have some more fresh slacked lime sown about the roots and stems; the ground is then raked. In about a fortnight or three weeks, this liming is repeated; and I then feel perfectly safe from the attack of caterpillars. The remedy is a very simple one—very easily applied; and, I have no doubt, others will find it quite as effectual as I have done.

A FEW FACTS CONNECTED WITH ORCHIDEOUS PLANTS.

By Mr. R. ERRINGTON, Gardener to Sir P. Egerton, Bart., Oulton Park, Cheshire.

IT may seem somewhat presumptuous in me to handle this subject, not being one of the great "growers"—as those are termed who early embarked in the pursuit, at an enormous outlay, and who, consequently, bid all other competitors defiance. Nevertheless, as knowledge is of an accumulative character, and as other minds are set at work, through the medium of hints or suggestions carrying a spark of novelty about them, I will proceed to comment on a few of the great principles which seems to govern their culture.

Atmospheric Moisture.—I feel persuaded that many structures appropriated to the culture of this lovely and eccentric tribe, are still deficient in their provisions for this essential element. I hope, however, that no one will suppose, I wish to see an Orchid-house in a suffocating condition, through what is termed steam! Quite the reverse; I merely want, so to charge the air with moisture, especially during their greatest rapidity of growth, as that, whilst as much moisture is permanently present in the atmosphere, as the plants can absorb, steaming would be entirely superfluous, and drip by all means avoided. As for the tossing of water two or three times a-day, on a few hot pipes,—that I consider a most pitiable course, if not an evil one. The fear of drip, it would appear, hinders many a one from using, at certain periods, a proper amount of atmospheric moisture: this ought not to be, and argues, in my opinion, defective ventilation; or, it may be, the use of too much fire-heat, at times when it would be much safer to descend several degrees in temperature.

Ventilation.—I encourage a slight amount of this, night and day; never shutting up entirely close during the dormant season, unless in cases of sheer necessity; and I can only say, that since I fearlessly adopted this course, a most marked improvement has taken place in the plants in general, both eastern and western species. I find it necessary, however, to keep a good deal of moisture about the parts beneath the stages; for it must be remembered that the dissipation is very considerable, when constant ventilation is had recourse to. The roof of our house is almost continually studded, here and there, with dew-drops; these seldom fall on the plants, or, at least, if they do fall, I can only say that I have not lost a bud, a leaf, or a shoot in consequence, up to this period. Fresh air is, of course, constantly entering; and this, passing over a pipe in a sunk panel, the bottom of which is generally covered with water, conveys the warmed air moistened throughout the house.

Light.—Of all the elements, however, necessary to the proper developement of the parts of Orchideous plants, none is of more importance than light. This may seem strange to young beginners, who will wonder, after this, why so much fuss is made about shading. Now, in this, as well as in propagation by cuttings, it becomes the student in Horticulture to make a *nice distinction*. The direct action of sunlight is one thing, its indirect or refracted action another; at least, as to its effects on the perspiratory organs of the plant. Nevertheless I am persuaded, that when these tribes are in good health, unshaken by capricious relapses in culture, they will endure, and enjoy much more sunlight than has hitherto been accorded them, especially when their early growth is nearly completed, or, say, towards August and September.

Independent, however, of the *direct* action of the solar rays, I do not think there is one, from any clime, but will benefit by all the light our climate affords; and herein I think the present practice of suspending baskets, &c. over orchids growing in pots, is not quite the thing to promote the highest point of culture. To be sure they are grown so, and grown well too: but this, I submit, is not the answer that will long satisfy a public eager for progress. Pines were grown well by a variety of modes, twenty years ago; did the public, however, rest satisfied with this fact? No; the question will constantly recur in this, as in other things, can these things be still better done? Is there any room for further progress? Any person looking, for instance, at Mr. Rucker's splendid collection, so admirably managed by Mr. Mylam, might, at first sight, imagine that the very summit of perfection had been attained. It will not, however, be found so, in the vegetable kingdom, to which it would appear our gracious Creator has set no bounds in this respect; or, if there be any bounds, I am at a loss to conceive in which of our vegetable productions it has become manifest?

Admitting, nevertheless, that the light, intercepted by baskets, or blocks, is indeed injurious to those in pots beneath, the question arises, what is to be done with the basket and block tribes? In my opinion, then, it would be good policy, in the case of two houses being considered requisite, to have one all stages or shelves for the pots, boxes, &c. &c.; and the other devoid of shelves, and fitted up to suspend the blocks and baskets from. I am perfectly aware it will be said that this arrangement would

not be consistent with the habits of the plants, or to the climate they come from—those from the Eastern hemisphere, as is well known, requiring generally both more heat and more moisture. Now, this will, and may be said with truth; and, at first sight, the objection appears insuperable. But for my own part, I should not fear of being able so to construct a house, as that both heat and moisture should be much greater at one end than the other; and that all intermediate climes should be fairly represented between, as far as the wants of the Orchids required it.

Now, in the block or basket house, provision might be made for a much greater amount of atmospheric moisture than in the pot-house; and, indeed, there would be no absolute necessity for having the house *exclusively* arranged for blocks and baskets; several modifications of the ordinary lean-to or span roof might be taken into consideration, which would in a proper degree combine, in part, shelf culture for special matters.

Before I conclude, I may, perhaps, be permitted to offer a few remarks of a miscellaneous character. Many of the Orchids are known to be "gross feeders," as gardeners term some plants. Now, as procuring fibrous peat, or moor soil, is, to many persons, very expensive, it may be well to know, that some of them will grow and thrive in ordinary turf, from a sandy upland pasture—what is called, indeed, "light sandy loam." I obtained some last year at this time, from the park, which has lain at rest for a century or more. After cutting it in squares of about an inch cube, it was highly dried—almost singed—on the top of a boiler. Some of the stronger Lycastes, and a few other things, were potted in this soil, with which occasionally a lump of peat was mixed. In re-potting lately, I found most of them adhering, with abundance of fibres, to the loamy turf—indeed, they seemed to have taken to it in preference to the peat.

VISITS TO REMARKABLE GARDENS.

PRESTON HALL, THE RESIDENCE OF E. L. BETTS, ESQ.

THIS fine estate, for many years the property of the Preston family, is situated near Aylesford, and about three miles from the town of Maidstone. It has lately passed by purchase into the hands of the gentleman whose name heads this article—one of the most fortunate of our great railway speculators—a man of almost boundless wealth, refined taste, and most enlightened and liberal views. Preston Hall is one of those ancient places which country people, more especially of the working classes, look upon with almost superstitious awe, the neighbourhood being celebrated, more especially the village of Aylesford, for its stories of the days of chivalry.

> "Old legends of the monkish page,
> Traditions of the saint and sage,
> Tales that have the rime of age,
> And chronicles of old."

Some years back, in making some alterations in the park, within a short distance of the present mansion, the foundation of an old house was found in a state of complete preservation, and in a brick oven several loaves of bread were discovered, quite perfect to appearance, but which soon crumbled into powder when exposed to the air. Coins have been found in various parts of the estate, and we were informed there are many old inhabitants of the neighbourhood who would willingly incur the expense of pulling the present mansion down (which must shortly give way to a new one in course of erection), if they might only be allowed the treasure which they suppose will be found concealed about the building. However great the treasure thus secreted may be, we apprehend that the present proprietor is taking more effectual means to discover the value of the property than in hunting after traditionary lore, and we suspect, some of his "diggings" will be found as permanently impregnated with gold's worth, as some of the celebrated washing-places of the Sacramento itself. The river Medway passes through the estate, upon the banks of which two wharfs have been erected, one for the landing of all necessary materials for the erection of the new mansion, offices, cottages, &c., and other, communicating by a branch railway with a pottery recently established upon one of the finest veins of clay in the country, and at an expense of several thousand pounds. In another part of the estate, stone is being quarried for the purpose of building the new mansion, and other necessary erections, such as park walls, &c., and from the same source lime is being made, by converting the waste stone into that useful article. We mention these things in passing to show what capital, properly directed, is capable of effecting, giving employment to hundreds of men, where dozens were not

employed before; and we believe we are within the mark in stating that these resources are likely to clear the fee-simple of the estate within the next fifteen years. At the time of our visit, 487 men and boys were employed upon the estate, the wages ranging from ten shillings to ten pounds per week.

To proceed, however, with the subjects as connected more immediately with the object of this work. The park is spacious; the surface is beautifully broken by undulations, and containing some very handsome specimens of trees, such as elms, oaks, thorns, &c., several of which, especially the elms, being remarkably fine. Upon a suitable knoll, commanding a fine view of the chain of Kentish hills, the mansion is now in course of erection, surrounded by Terrace Gardens, from the designs, and under the superintendence of Mr. Nesfield. That the arrangement of this garden will be highly effective, no one who has seen Mr. Nesfield's works can, for a moment, doubt; but it is to be hoped, that in selecting plants for this terrace, he will venture to depart from the custom of by-gone times, and use some of the many new and beautiful shrubs now so numerous and appropriate, where plants of formal habit are required; for, however necessary it may formerly have been to use only such plants as yew, box, holly, and the like, clipped, pruned, and tortured too frequently into very unsightly forms, there can be no such excuse now, when the researches of Botanical Collectors, and the enterprise of private individuals, have placed within the reach of every one, plants, equally suitable, and far more effective, which, when properly planted, will require no pruning beyond the occasional use of the finger and thumb to curtail exuberant growth, and to make them assume at once suitable, but at the same time natural and elegant forms. In the front of the house in the park, a lake of some fifteen or twenty acres is to be formed, and for the purpose of supplying it, as well as the house, garden, &c., an engine is to be erected, to draw the water from a spring some two or three miles distant, passing in its course under the bed of the Medway, delivering it first at the house, and passing thence to the fountains; from the fountains to the kitchen garden, and forcing-houses; from the latter to the farm-yard, and thence to the lake.

Writing of the farm-yard, reminds us of a barn built A.D. 1100, the timber used being Spanish chesnut, which is in as fine a state of preservation as could possibly be desired; and looking as little likely to be affected by the next, as it has been by the last 750 years. In some parts where the sap wood has been left, dry rot is making inroads; but, so far as we could ascertain, the heart wood was as sound as could possibly be desired. This is a good lesson for planters; and it is to be hoped, that upon suitable soils, they will not fail to avail themselves of it.

Running parallel with the park wall, and some two hundred yards from the south and entrance front of the house, is the Maidstone and London Road, and abutting upon this road, and in a straight line with the front door, the principal entrance gates and lodges are to be erected. This, we venture to assert, is a great mistake, not only as converting the mansion into a mere road-side house, and exposing to every person the narrowness of the park in that direction, but also by detracting from the magnitude of the estate, by showing a public thoroughfare within a few yards of the house. Had the old entrance from Maidstone been retained, letting the approach road wind gently through the park, showing in its course some nice bits of landscape scenery, and some splendid specimens of trees—enriching, at the same time, the sides of the plantations by the introduction of good evergreens, and single specimen trees of Cedrus Deodara, and Libani, Araucaria imbricata, Taxodium sempervirens, Cryptomeria japonica, and other of the finer kinds of Pinus, Quercus, Cratægus, &c.; and had the new entrance from London been made near the south-west corner of the park, taking also a gentle sweep to the house, planting this also in the same manner, something imposing, something rich, and different from the common run of entrances, might have been produced; but as it is, the narrowness of the land is shown at the first view, and a mansion and terrace of high architectural and artistic finish, instead of standing, as it were, in the centre of an extensive demesne, embosomed in rich and appropriate scenery, is converted by this one false step into a mere suburban villa, which only wants the accompaniment of a passing omnibus to fancy it on Clapham Common, or within the sound of Bow bells. If, for the sake of appropriate finish to the south front, a straight line was necessary in that direction, why, then, a broad grass walk, with a double row of Cedrus Deodara on each side, would have been more appropriate, while a group of figures, an obelisk, or a temple, at the end of the avenue or view, would have given at once an artistic and harmonious finish to the scene.

A new kitchen garden, and a range of ten forcing houses, with appropriate pine, melon, cucumber, and other pits are already formed, which, together with the pleasure-grounds, must form the subject of another paper. In conclusion, we must not omit to remark that the practical direction of the garden is under the care of Mr. T. Frost, a brother, we believe, of Mr. Frost, Lady Grenville's gardener at Dropmore.

A.

CALEDONIAN HORTICULTURAL SOCIETY.

The Winter Annual Meeting was held on December 6th, in the Experimental Gardens, Inverleith, when the office-bearers for 1850 were elected, and various prizes were awarded, as follows:—For Dessert Pears, exclusive of Marie Louise, prizes were awarded to Mr. J. Morrison, gardener to Robert Ainslie, Esq., of Elvingston, for Chaumontelle, Gansell's Bergamot, and Crassanne; and to Mr. Baxter, gardener to Sir J. Gibson Craig, Bart., Riccarton, for Beurré Rance, Easter Beurré, and Winter Nelis. Fine Marie Louise Pears were exhibited by Mr. Morrison. For Table Apples, prizes were voted to Mr. A. Calder, gardener to Lady Harris, Seacliff, for Seacliff Apple, Gravenstein, Borsdorffer, Ribston Pippin, King of Pippins, and Old Nonpareil; and to Mr. Morrison for Scarlet Nonpareil, Gellini, Paradise Pippin, Ribston Pippin, Melville Pippin, and Cephalonia. Mr. M'Intosh, of Dalkeith, sent a fine collection of fruit, including two Pine Apples, and fifty varieties of Apples proved and named at Dalkeith. Mr. Baxter, of Riccarton, sent four fine bunches of retarded Grapes, one of which, named Abercairney Seedling, was particularly pointed out as a good Winter Grape. German Greens, of Alder's fine dwarf variety, were sent by Mr. Mitchell, gardener to Lady Keith, Ravelston; the Scotch Flag Leek, large and well blanched, by Mr. Blair, gardener to J. C. Renton, Esq.; and Celery—Seymour's matchless red and superb white, from Mr. Sinclair, gardener, Tillechewan Castle, Dumbarton—and Sutton's superb white, and Cole's dwarf red, from Mr. Henderson, gardener to C. K. Sievewright, Esq., Cargilfield. Wyatt's variety of Red Beet from Mr. King, gardener to A. Campbell, Esq., of Duddingston Lodge, was selected for reward. For Onions, prizes were given to Mr. Morrison for Deptford, James' Keeping, and Blood red; and to Mr. Allan, gardener, Seaparek, Forres, for Reading, James' Keeping, and Strasburg. Mr. Blair, of Mordington House, exhibited six varieties of seedling Potatoes raised from American seeds, which were ordered to be tried in the Society's garden.

Chrysanthemums were the principal flowers exhibited. The prizes for single clusters of twelve varieties were awarded to Mr. Young, gardener to Mrs. H. N. Ferguson, of Archerfield, who had Minerva, Duc de Nemours, General Morceau, Salter's Annie, Queen of Yellows, Princess Maria, Clustered Yellow, Queen Victoria, Comte de Rantzau, Bicolor, Queen, and Marquis; and to Mr. Mitchell, for Temple of Solomon, Princess Marie, Antoinette, Celestial, Queen, Salter's Annie, and others. For the most dwarf and finest-flowered plants, the prize was awarded to Mr. A. Sleigh, gardener to the Lord Advocate, Lamiston Castle, the kinds being Bicolor, Queen, Mirabile, and David. Mr. Addison, of Gosford, sent three fine seedling Chinese Primroses, for one of which, a cross between the rose and white varieties, a certificate of merit was granted. Messrs. P. Lawson and Son offered a prize of Two Guineas for the best collection of dried specimens of Hardy Perennial Herbaceous Plants, which was awarded to Mr. J. Jeffrey, journeyman, at the Royal Botanic Gardens, Edinburgh, whose collection contained 1,692 species and varieties. The Silver Medal of the Society was given, as second prize, to Mr. A. Jaffrey, journeyman, Experimental Gardens, whose collection consisted of 2,045 species and varieties, and also contained several sheets of carefully executed dissections of the parts of the flower. Both collections were arranged according to the Natural System. The Silver Medal, offered by the Society for the best collection of British plants, including Filices, was awarded to Mr. G. M'Hattie, journeyman, Royal Botanic Garden, whose Hortus Siccus included 570 species, correctly named and arranged according to the Natural System. A second prize, with certificate of merit, was voted to Mr. J. Pender, journeyman, Barnton, for a collection containing 363 species, arranged according to the system of Linnæus. An additional award, with certificate of merit, was granted to Mr. W. Syme, journeyman, Blairhill, Stirling, who produced a collection, consisting of 102 species, correctly named. These various collections of dried plants had been carefully examined by the Professor of Botany and two other distinguished botanists, who reported that they were so extensive, and the nomenclature so accurate, as to do credit to the competitors, not merely as highly intelligent practical gardeners, but as advanced students in botany.

REVIEW.

Gardening for Children. Edited by the Rev. C. A. Johns, B.A., F.L.S. Second Edition. London: C. Cox, King William Street, Strand.

The idea of this little book is excellent; and it is well executed. A series of instructions on all the leading operations of gardening are strung together in a narrative which just serves to carry on the attention from one fact to another; and in this way the little gardeners are taught, in plain and simple language, how to manage the plots which "Papa" has given them to cultivate. Although it is professedly a mere skimming of the surface of the subject,—diving too deeply for the comprehension of the child being studiously avoided,—yet there are, in some parts, important facts and lessons of which children of a larger growth sometimes need to be reminded: such are a set of gardening maxims that appropriately close the little volume, which is, moreover, prettily got up—small square pages, about five inches by four, numbering up to 182, well printed, interspersed with many pions reflections, and illustrated by upwards of sixty neat wood-engravings of garden tools, choice flowers, weeds, and such like.

"Little Willy's" first gardening scheme is so quaint, that we cannot refrain from quoting it, as an illustration of the reverend author's style:—"One evening, in October, a little boy was sitting, with his father and mother, busily occupied in picking caraway seeds out of some biscuits which had been given him for his evening's meal. Presently he looked up, with an air of great satisfaction, and said, 'Look, mamma, what a lot of seeds I have got!' 'Well, Willy, and what are you going to do with them?' 'Oh, papa has given me a little garden for my own, and when the right time comes, I shall sow them in the ground; and then they will grow up into plants, and I shall be able to pick from them as many caraway biscuits as ever I like!'"

NEW AND RARE PLANTS.

Ixora laxiflora, *Smith.* Lax-flowered Ixora.—Nat. Ord., Cinchonaceæ, § Cinchoneæ.—Syn., I. brachyloba, *De Candolle.*—An ornamental stove shrub,

growing three to four feet high. The leaves are opposite, oblong, lance-shaped, acuminate, attenuated at the base into a very short petiole, with ovate-acuminate appressed stipules; the largest leaves a foot or more in length. The flowers grow in large, terminal, trichotomous panicles, white, delicately tinged with pink, very fragrant; the calyx is deep red; the corolla consists of a very slender tube, an inch and a half long, with a spreading limb cut to the base into four spreading obovate segments.—From Sierra Leone; introduced by Mr. Whitfield in 1848. Messrs. Lucombe, Pince, and Co., of Exeter.*

Sinningia punctata, *Scheidweiler.* Dotted-flowered Sinningia.—Nat. Ord., Gesneraceæ, § Gesnereæ.—A handsome, tuberous-rooted, stove perennial, with a suffruticose branching stem of six or eight inches high. The leaves are oblong-ovate, stalked, crenulate. The flowers are numerous, each plant bearing from twenty to thirty, axillary, solitary, glandular-pubescent, pale externally, spotted on the inner surface with very fine purple dots.—From Brazil; introduced to Belgium, in 1849, by M. Libon. Flowers in summer and autumn. M. de Jonghe, of Brussels.

Franciscea eximia, *Scheidweiler.* Excellent Franciscea.—Nat. Ord., Scrophulariaceæ, § Salpiglossideæ.—A beautiful stove shrub, evergreen, growing to the height of three to five feet, with erect, downy branches. The leaves are oblong-lanceolate, acuminate. The flowers grow in loose, two, three, or four-flowered cymes; they are three inches in diameter, deep blue-purple, becoming white after expansion. From Brazil; introduced to Belgium, in 1847, by M. Libon. Flowers in the spring. M. de Jonghe, of Brussels.

Dipladenia illustris, *Martius.* Illustrious Dipladenia.—Nat. Ord., Apocynaceæ, § Wrighteæ.—Syn., Echites illustris, *Arrabida;* E. insignis, of *Belgian gardens.*—A showy, tuberous-rooted perennial, with annual stems, from a foot and a half to two feet high. The leaves are opposite, obovate-rotundate, pubescent. The flowers grow, three or four, at the extremity of the stems, and are rose-coloured, with a purple throat. From Brazil; introduced to Belgium in 1848. Flowers in summer. M. de Jonghe, of Brussels.

Tabernæmontana longiflora, *Bentham.* Long-flowered Tabernæmontana.—Nat. Ord., Apocynaceæ, § Plumiereæ.—A fine stove shrub, of erect branching habit. The leaves are large, opposite, elliptical. The flowers grow on axillary peduncles, or two placed together at the ends of the branches, bearing about three flowers in a cyme; the corolla is white or pale cream-colour, large, and having a delicious aromatic fragrance like that of cloves; its tube is four inches long, twisted, and swollen below the middle, terminating in a limb of

five waved, or reflexed tongue-shaped lobes. From Sierra Leone; introduced by Mr. Whitfield in 1848. Messrs. Lucombe, Pince, and Co., of Exeter.‡

* *Bot. Mag.*, t. 4482.

‡ *Bot. Mag.*, t. 4484.

Anemone Japonica var. Hybrida

ANEMONE JAPONICA, VAR. HYBRIDA.

Nat. Order, RANUNCULACEÆ, ♀ ANEMONEÆ.

GENERIC CHARACTER.—*Involucre*, of three variously-cut leaves, distant from the flower. *Calyx* of five or many petal-like coloured sepals, imbricate in æstivation. *Petals* wanting. *Stamens* indefinite, all fertile, or the outer sterile, gland-like. *Ovaries* many, free, uniloeular. *Ovule* solitary, pendulous. *Achenia* many, unarmed, or tipped with the bearded plumose styles. *Seed* inverted

A. JAPONICA.—*Zucc. & Siebold.*—Japanese Anemone.—Caulescent; radical and cauline leaves ternately cut, segments cordate three-lobed and irregularly doubly serrate; involucral leaves stalked, wedge-shaped at the base and resembling the rest; upper leaves sessile; peduncles elongated, or naked, one-flowered, or forked-branched and again furnished with involucres; sepals more than twenty, silky on the outside, oblong obtuse plaited, the outer ones greenish at the back so as to resemble a distinct calyx. Achenia unarmed, densely villous.

A. japonica, var. *hybrida.*—Radical leaves palmate five-lobed, somewhat heart-shaped at the base: lobes twice serrate; sepals broader, somewhat concave; flowers paler.

DESCRIPTION.—A very fine, hardy, autumn-blooming, perennial herb. Stems slightly clothed with short hairs, growing about two feet high, dividing near the middle into branches, the central one bearing a single flower, the lateral, each terminated by a small cluster. Radical leaves on long stalks, palmate, five-lobed, and twice serrated; those of the stem, three-lobed, smaller, with short broad stalks. Flowers numerous, large, nearly three inches in diameter, composed of numerous obovate, concave sepals, a delicate pink, or pale rose-colour, broader, and more regular in form than those of the Japanese Anemone.

HISTORY, &c.—A hybrid variety of the Japanese Anemone, raised between that species and the white Indian A. vitifolia, a species having a somewhat similar habit of growth, but with smaller, cup-shaped blossoms of considerable beauty, and five-seven-lobed, roundish, heart-shaped radical leaves. The result of the cross has been to infuse some of the form and proportions of the Indian into the larger Japanese species, at the expense of its colour. The hybrid is, nevertheless, a very showy and highly desirable plant, with delicate pink, or pale rose-coloured flowers. Like the species, it is an autumn bloomer, and exceedingly well adapted for autumn-beds in the flower-garden. It was raised in the garden of the Horticultural Society at Chiswick.

CULTURE.—A hardy perennial, growing freely in the open border, in rich loamy soil, if kept moist at the root at all seasons. It may also be very appropriately grown in pots, for the decoration of the greenhouse or conservatory, during the autumn, before the Chrysanthemums come into flower. For pot-culture the plants should be divided annually in spring, before they commence growing; the wire-like roots being cut into portions of an inch in length, planted a quarter of an inch deep in pans or pots filled with a light, rich compost of sandy loam peat and cow-dung, and placed in a moist frame, with gentle heat. By the beginning of May they will be large enough to be re-potted singly into three-inch pots, in the same kind of soil; they should be returned to the frame until established, when they may be removed to a cold frame, and thence to a shady situation out of doors. About the end of June, select the strongest plants, and put about half-a-dozen into a twelve-inch pot of rich soil; place them in a shaded situation, giving them plenty of water. By the middle of August, remove them to the greenhouse or conservatory, to blossom.

For the flower-garden, the old plants should be divided about the end of March, planted out in May into rich loamy soil, and well supplied with water during summer. Beyond this, they require only to be divided and re-planted once in two or three years, without which removal they are apt to become weakly in their growth.

The name of the genus Anemone, or wind-flower, is derived from the Greek *anemos*, wind; and the plants are said to have been so named from an old opinion that they never blossomed, except when the wind blew: they do mostly blow in windy seasons, and many are found to grow naturally in exposed and elevated situations.

Vegetable Physiology.

By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

Introductory.

MY object in the series of papers I propose to offer to the readers of this Magazine, is, to give a simple and plain continuous view of the principles of Vegetable Physiology, so far as they have been clearly ascertained at the present time, and to explain and illustrate these by allusions to familiar and practical instances, so that general readers, and gardeners in particular, may draw, from an attentive consideration of the facts and laws laid before them, a groundwork for practical observation and experiment.

I do not intend to write what is very often written under the name of "Popular Science," but rather aim at furnishing *common sense* views, as founded upon facts which are open to the investigation of all. On no subject has more misconception arisen than on this "Popular Science," by which many understand vague generalities dressed up in an amusing form, and seasoned with anecdotes, which, interesting in themselves, often have no important bearing on the subject in hand. It may be well to sketch out, briefly, what I consider to be the relative position of science, properly so-called, to the business of life, or to particular arts, such as gardening or agriculture.

The first men of science were persons who inquired more narrowly than their fellows into the proceedings which they saw going on around them, and into the *meaning* of the operations which they themselves performed. They began to describe these, and to search for causes. Their next followers had the advantage of their written experience to guide and assist in new observations; so that, after a time, certain general principles began to be perceived, and what are called laws were discovered. The modern student of science has, in like manner, the recorded experience of those who preceded him to examine and master, before he can place himself in a position to advance his subject; and, in addition to the ascertained facts and laws, he always will find, in the present condition of science, a mass of imperfect knowledge, consisting of half-examined phenomena, speculative theories, and the like, which cannot, for the time, be turned to practical account. Thus, the professed scientific inquirer is to be looked upon as the pioneer of knowledge, engaged in clearing a way through unexplored regions, making efforts—often, very often, fruitless—to attain to new points, from whence he may survey new regions of knowledge; and, in these incursions into the realm of the unknown, making acquaintance with many things which cannot, like the relations of a traveller, be told as a simple tale; but must, from their novelty, the partial view he has had of them, and their apparently complicated connection with each other, remain a vague and unsatisfactory subject of inquiry to the general public, until a more complete knowledge allows of the formation of clear charts, accurate measurements, and plain descriptions, by means of which, high roads and safe routes might be opened across the tract, and the whole be reclaimed within the territory of established knowledge.

For this is precisely the kind of process that takes place. The theories of science of one generation become the accepted facts of common sense in the next; and, as the public mind becomes familiar with the new objects and the new laws, the new words by which they are denominated are gradually brought into common language. Let no one, therefore, quarrel with scientific men, that they do not explain *all* they know in popular language—popular language has no words to express, without long and tedious circumlocution, much that is familiar to the advanced student of a scientific subject; and it would be as absurd to deny to him the convenience of fixed brief terms (scientific short-hand, in fact) to express his thoughts to his fellow-worker, as to deny to the mechanic a proper technical name for his tools. Scientific men—that is, the truly scientific—invent words to facilitate, not to obstruct, the progress of science. There may be, and, indeed, is occasionally, an abuse of this privilege; but it is an indispensable one.

In essays like the present, which aim at bringing new stores of knowledge into the domain of the common sense of the general public, the main object to be kept in view is to confine oneself to so much of the subject as is susceptible of being clearly and simply explained, leaving on one side those uncertain points, which, until they have been worked out much farther by scientific investigation, cannot be applied to practical purposes; and this I would rather call diffusing *useful knowledge*, than teaching *popular science*, which is commonly supposed to be capable of conveying useful instruction, without any pains on the part of the receiver. Nothing that is worth having is to be obtained for nothing; but much may be done in facilitating the acquirement of knowledge, as in the attainment of all other things, by the

adoption of good methods, and by remembering the golden rule, not to try for too much. All I ask of the reader is, to read carefully and attentively, and to consider well the connexion of the different parts of the subject, as successively placed before him, since the various phenomena of life, in vegetables as in animals, are so closely connected with the laws of the dead world, as well as with each other, that no sound knowledge of vegetable physiology can be acquired without taking account at once of the physical and chemical principles which are continually active in modifying vegetation, and of the physiological principles which give to it its peculiar character in creation.

I shall first point out, as briefly as possible, the chief of these laws of the dead or inorganic world that must be mastered before we can comprehend the phenomena of life and growth; and, in so doing, I shall endeavour to find illustrations in facts or operations, that every one may verify by observation in the circumstances of daily life; by this means, to impress them with a reality and distinctness, which mere statements would not possess. From these we will pass to an account of the construction of plants—the nature and condition of the parts of which they are composed and built up; going only so deep into the subject as is necessary for general practical purposes, passing over the delicate minutiæ, and also over such portions of the subject as are still subjects of discussion, as foreign to our purpose. The chief modifications of form depending on this internal construction, will be the next pointed out; and then we shall have arrived at a condition in which the general nature of the processes exhibited in the *life* of plants, such as their growth, reproduction, &c., may be comprehended in their full meaning. This portion will, of course, involve what is called the *nutrition* of plants; and we shall, therefore, also have to examine their relation to the atmosphere, the soil, and similar external agencies.

The phenomena of a special character, such as the colour, odour, &c., will be considered in their turn, and the body of knowledge thus accumulated, besides the direct practical use to which it may be applied, will also, it is hoped, facilitate the comprehension of the great purposes of the vegetable world, its place in the economy of nature; and, like all true knowledge, lead to a better, because a more enlightened, acknowledgment of the goodness and power of its beneficent Creator.

At the same time, however, I would wish to add, that, although I have insisted strongly on the necessity of directing attention chiefly to definite laws and facts, I do not wish it to be imagined that I intend to give a dry, purely logical, account of the subject. I shall seize every opportunity to enliven the papers with such illustrations from general subjects as will help to explain my meaning more clearly, and,—while keeping distinctly in view one main thread of argument through the whole series,—will turn aside, as occasion may arise, to point out, episodically, interesting or amusing facts, wherever opportunity offers of so doing. And, indeed, it is impossible to cast our eyes anywhere into the economy of nature,—whether in the grand manifestations of power uttered in the phenomena of geology, or even in those of meteorology, as going on around us now, or in the marvellously delicate operations which we can only discern by means of our microscopes,—without finding an inexhaustible source of interesting reflection; every new fact we meet with, seems to open out a new prospect beyond it of things undreamt of before; every new law we determine, exhibits to us more clearly that variety in unity, that inter-dependance of all existing things, which has been and ever will be the great theme of admiration to the highest minds. This it is which gives a dignity to the sincere study of the, apparently, most trifling objects in nature; no one can ascertain any single fact, nor record any carefully made observations, even on the most minute or obscure of Nature's works, without doing some service to the progress of human knowledge; for since the world is one great whole, of which every particle has its appointed place and office, its individual existence, and its influence on all the other parts,—by which it is itself in like manner influenced,—*all* must be clearly made out before an exact knowledge can be acquired of *entire* characters of *any one* part. Knowledge has now attained to such a vast extent, that one mind can scarcely hope to travel over all its provinces, and make personal acquaintance with its individual features; but, as knowledge extends, it also becomes simplified by generalization; it is not, therefore, so hard a task to acquire a tolerable knowledge of the essential principles of each department, while the desire for facts and particulars may be gratified in the study of one particular subject. I hope to be able to unite, a general outline of vegetable physiology such as it is desirable that all educated persons should possess who lead a country life, with just so much special illustration as may give a direct practical character to the picture of facts, sufficiently interesting to indicate how great a fund of entertaining and useful information may be obtained by a personal investigation into the more abstruse questions of the science.

ON THE CULTURE OF ERIOSTEMONS.

By Mr. GEORGE FREEMAN, Botanic Garden, Chelsea.

Eriostemon, *Smith.*—From *Erion*, Wool, and *Stemon*, Stamen: from the Woolly Stamens.

Nat. Order, Rutaceæ.

THE Eriostemons are greenhouse evergreen shrubs, generally of compact habit, and much sought after by exhibitors of plants. They, as well as most other of the races with which gardeners have to deal, possess their peculiarities, which must be attended to, in order to insure success in their cultivation. Some of them, particularly E. buxifolium, scabrum, and intermedium, are better grown as pyramids, than as dense dwarf bushes. To have them of this shape, it is necessary to begin with young healthy plants having a leading shoot. It is immaterial whether the plants be grafted or not; but the nurserymen generally graft them, as they thus obtain more readily a supply of plants.

ERIOSTEMON INTERMEDIUM.

If the plants are obtained in the spring, set to work with them immediately. Those that want repotting, should have a liberal shift at once into the following compost, which will also serve to grow them in afterwards:—Three parts good turfy peat earth, to one part silver sand, using a liberal quantity of charcoal, both for drainage, and also mixed with the soil. The pots should be well drained with potsherds; and a little of the roughest peat, or some moss, should be placed over the drainage to keep it free and open. This is a great point in the growth of potted plants. After they are potted, they should be watered freely, and then placed into an intermediate house, if large good plants are wanted in the shortest space of time. If not, and slower growth is preferred, which is perhaps preferable, the ordinary greenhouse will do very well for them, if the part of the house where they are placed is kept rather close, until they are established in their new pots, when they will soon begin to grow vigorously. It is then necessary to keep the middle stem, or leading shoot, protected by means of a small stake, which, for that purpose, should be a little longer than the shoot. If one side of the plant is inclined to grow more than the other, keep that side cut back a little, until the other side has made equal growth, and that part of the plant which is thus behind should be turned towards the lightest part of the house, in order to encourage it as much as possible. If they go on favourably, they may be syringed every fine morning, and a little air given. Bear in mind, however, that they must be shielded from cutting winds, which check them, and turn their foliage of a brownish colour. When they are growing freely, they sometimes show a disposition to callons up the stem; if any sign of this should appear, discontinue the syringing, and give more air until the wood gets a little hardened, which will be a kind of rest for them. After a time they may be examined, and repotted if they are pretty well rooted. This will give them as much pot-room as they will require in one season.

After this second shift, they would do best in a frame that could be kept close until they had got rooted into the fresh soil, and then raised by degrees, to admit plenty of air round the bottom of the plants; for it is necessary that the second growth should be slower and more stocky; and, to this end, watering over head should, to a great extent, be discontinued, that the wood may become firm and well ripened, so as to withstand the winter. The plants will at this latter season continue rooting without any growth of wood, and will be pretty well pot-bound by the following spring, when they should be treated in the same way as before; and this treatment must be continued year after year, until they are good specimen plants, which will be in the third or fourth season.

The stronger growing kinds may be managed in the same way, except that they require more pot room, and should from time to time be stopped back to produce bushy growth.

The following are the best half dozen of the introduced species:—

E. scabrum. A dwarf evergreen shrub, with linear acute leaves, covered with minute asperities, and numerous axillary whitish flowers, deeply tinged with pink. New Holland. Introduced since 1840.

E. buxifolium. A dwarf evergreen shrub, with small smooth broadly elliptic leaves, and white flowers, tinged with pale rose. New Holland. Introduced 1822.

E. intermedium. A moderate sized evergreen shrub, with large oblong obovate leaves, rather glaucous, and having glandular dots, and large white flowers, somewhat tinged with pink. New Holland. Introduced since 1840.

E. myoporoïdes. A moderate sized evergreen shrub, with smooth lanceolate leaves, having glandular dots, and large flowers, white tinged with pink. New Holland. Introduced 1824.

E. cuspidatum. A strong-growing evergreen shrub, with large oblong lance-shaped glaucous leaves, ending in a hooked point, and pale pinkish or rose coloured flowers. New Holland. Introduced 1823.

E. salicifolium. A strong growing evergreen shrub, having large linear lanceolate smooth leaves and pinkish flowers. New Holland. Introduced 1824.

They all bloom during the spring and early summer months, from April to July or August; and the flowers are, in all the species, more or less deeply tinged with pink or rose colour, when developed in a low temperature, and exposed to free air and light. They also generally open with more of the pinky tinge, than they retain as they approach the period of their decay.

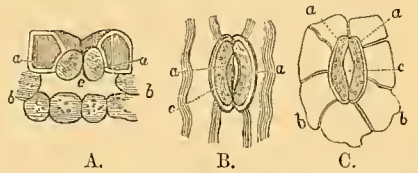
THE PRINCIPLES ON WHICH PLANTS ARE PROPAGATED BY CUTTINGS.

By Mr. WILLIAM KEANE, Author of "The Beauties of Surrey," &c.

THE propagation of plants by cuttings is an operation of frequent use, and of considerable importance in all horticultural establishments. The many thousand plants that are annually propagated to embellish Flower-gardens and Pleasure grounds, and the taste displayed in the arrangement of colours, demand the greatest skill, vigilance, and forethought, to prepare, to arrange, and to provide for the display, that the pioneers of modern improvements, and of refined taste, have introduced into Flower-garden and Pleasure-ground scenery.

The conditions necessary for the propagation of plants by cuttings are, a certain portion of organized matter, the assistance of leaves, a degree of heat and moisture accordant with the nature of the plant, and free drainage at the roots.

When the aqueous or ascending sap reaches the leaves, the water is discharged through the minute invisible pores, called stomata, and by the decomposition of carbonic acid gas, which separates its carbon, and sets the oxygen free, a vital action is performed, by which the sap is elaborated or changed into the organic matter, called the "true" or descending sap. It is then that all parts of the plant are supplied with a store of organized matter, which renders the parts fit to be employed as cuttings. When removed from the parent, that store, under proper management, will enable them to put forth roots and new leaves, and to develope all the parts required for the growth of the plant. If the shoots are in a rapid state of growth, full of rising sap, their tissues lax and not matured, failures may be expected to attend all attempts to propagate them by cuttings.



A. *Stomata* of the Iris. *a a*, Green cells bounding the orifice. *b b*, Cells of the parenchyma. *c*, Air-chamber.
B. The same from above. *a a*, Cells of the stoma between the long cells of the cuticle. *c*, Opening between them.
C. Stoma of apple-leaf. *a*, Cells of ditto. *b b*, Cells of the cuticle. *c*, Opening of stoma.

The next part of the subject is to inquire in what manner the leaves retained on the cuttings assist the protrusion of roots, and the development of other leaves.

As the removal of the cutting from the parent branch will make no change in the nature of the sap, which is always more or less in circulation in the whole system of the plant, and as it is the office of the cambium, or proper juice, to descend in the cutting to the joint at which it was cut; when its downward course is impeded, it accumulates there until a callous is formed, and roots are protruded; the organized matter of the cutting is diminished to supply the development of roots, and the leaves are required to secrete more, to replace that which was expended in the formation of roots. It is when there is sufficient organized matter in the cutting to supply the roots without exhausting its own vital energies, that the external assistance derived from the leaves may not be needed.

Heat and moisture are very useful agents in the propagation of cuttings. It is unnecessary to specify the various degrees of temperature that various plants require: but let the temperature or

heat to be applied to the cuttings, correspond with that in which the parent plant had grown; this is the plainest rule by which the temperature suited to the cuttings may be comprehended. If the cuttings are inserted in a temperature by which an unusual degree of excitement is produced in their organs, the stimulus given to the system by the heat will cause it to expend its organized matter in the production of leaves and the elongation of the stem. By the application of the temperature natural to the constitution of the cutting, the organized matter would descend to form roots; but by the unnatural excitement of an increased temperature, it would be forced to ascend to expand the buds into leaves, and thus to become expended in the atmosphere above; at the same time, in consequence of the absence of roots, no supply could be produced from below to support the increased demands of the leaves and stem. The result of this is speedy death.

With a proper degree of heat, moisture is a very useful assistant for the growth of cuttings. It is by the moisture that surrounds them that their vital action is maintained, and this action aided by the stimulus of light produces organic matter—that nutritious material, which serves for the development of the whole plant.

It is when the cuttings have produced all the organs of a plant, that an increase of bottom heat may be advantageously given. The stimulus being applied at the proper time, in conjunction with the other conditions—light and moisture—the cuttings progress rapidly to the development of a perfect plant.

The last condition, and one of great importance, is to have the soil in which the cuttings are inserted well drained. In that state the atmospheric agents and aqueous vapour have free access to pass and re-pass the absorbent or root end of the cutting, and are ready to supply it with food when needed. Water stagnating at the root end of the cutting, and atmospheric influences excluded by stiff and impervious soils, will produce that black gangrene—the death of cuttings.

DOMESTIC GARDENING.—No. I.

By Mr. J. SPENCER, C.M.H.S., Gardener to the Marquis of Lansdowne.

I have lately built me a grape-house, what kind of Vines ought I to plant in it? said an amateur friend to me one day. What kind of house do you advise me to build for Vine-growing? writes a second. A third is anxious to try his hand at Pine-growing, if he had only a few plain hints how to grow them; while the number of parties building plant-houses, pits for Melons, Cucumbers, and various other things, as their taste leads them to prefer, is wonderful. Such being the case, I think I cannot better fulfil the object of this publication, than by commencing a series of papers calculated to meet the requirements of so important a class, who have, at present, no guide to follow, sufficiently plain for them to understand.

My first object will be to show such persons the cheapest and most eligible forms of houses in which Fruit and Flowers may be grown; the mode of constructing them, and their after-management; while the formation and management of Fruit and Vegetable Gardens will afterwards be fully explained. It is my wish to render each part of my subject sufficiently plain and explicit to be understood by all, however limited their present knowledge of gardening may be, and such as will enable them to manage their favourite hobby, without encountering those many failures, which have so often thrown a damp on their labours, and been the cause of their giving up in despair one of the most rational of recreations. Let me add—I hope the information these papers may contain will be the occasion of fresh recruits joining the ranks of cultivators, and the means of disseminating a love for gardening among all who can indulge in the pleasure, aye, and profit, too, it affords.

It will at once be obvious, that these remarks are addressed to the consideration of those who manage their own gardens; but in these times of retrenchment and economy, I question whether there is not much to be learned in respect of the more economical erection of glass-houses by gardeners themselves, and whether it will not be found that houses capable of growing every description of Fruits and Flowers in the greatest perfection, may now be erected for one-third the sum they usually cost.*

In commencing with detailed methods of erecting glass-houses suited to the wants of domestic gardeners, my great object will be simplicity of construction, entailing a consequent economy in the after-management. Subsequent papers will contain plain and ample instructions for managing the many and various productions which help to supply the wants, and afford a means of recreation and amusement to the domestic gardener.

* Of course these remarks do not apply to houses erected for architectural effect.

REVIEW.

Garden Almanacks for 1850:—"The Gardener's Almanack," by G. W. Johnson (Stationers' Company). "Glenny's Garden Almanack," (Cox, King William Street, Strand). "The Agricultural and Horticultural Almanack and Diary," by M. M. Milburn, and a Practical Gardener (Groombridge).

The first of these annuals is the best-looking book, and contains a goodly proportion of useful reference matter in the various departments of gardening; but it bears evidence of hurried or careless preparation, in certain uncorrected particulars, the materials for correcting which must be within reach of its editor.—The second contains a variety of sound, useful, practical information, conveyed in the peculiar and well-known style of the author, and is perhaps rather less querulous than usual; and so far is improved. The list of florists' flowers is the important feature.—The last-named is the cheapest, and is this year improved in appearance, though in this respect there is still room for improvement. One half is devoted to agricultural information, the remainder to horticultural matters. The peculiar feature of this almanack is the descriptive list of new plants introduced or made known during the year, which in itself is worth more than the cost of the book. They may all be consulted with advantage as remembrancers, and should be found on the table of all gardeners and garden amateurs.

EXTRACTS AND MEMORANDA.

Victoria regia.—The blossoming of the Victoria regia, which has taken place at Chatsworth, is one of the great features of the year 1849, as far as horticulture is concerned. This plant, made known some few years since by Sir R. Schomburgk, and of which seeds have been introduced, on some few occasions, within the last two or three years, was raised in some quantity at Kew, in the spring of 1849; and one of the plants obtained by Mr. Paxton, has produced flowers and ripe fruit. Its progress was remarkably rapid. It had germinated by March 23rd; was transferred to Chatsworth on August 3rd; was planted in its tank on August 10th; showed its first flower-bud on November 1st; expanded its first flower on November 8th; and had ripened seeds by December 10th. Mr. Paxton's mode of culture has been thus explained:*—In a hothouse, a tank was constructed three feet deep and twelve feet square, warmed by hot water. This tank was afterwards enlarged to about nineteen feet square, by the addition of a shallow ledge nine inches deep and three and a-half feet wide, heated by a triple row of small lead pipes. In the centre of the tank was placed a large hillock of soil—burnt loam and peat. Mr. Paxton attaches great importance to the burning of the soil, by which means weeds and insects were destroyed, as well as all such matters, as would have been ready to enter into fermentation or rapid decomposition, when in contact with water heated to eighty-five degrees. The water was thus kept perfectly translucent; and in order to keep it in motion, there was added at one corner a wheel, over which water was caused to drop continually with force enough to keep the wheel constantly revolving—the water thus continually flowing in, and the surplus flowing out by means of a small pipe near the bottom. The water was kept heated to about eighty-five degrees. The flower itself, when it first opens, resembles the white water-lily, of a dazzling white, with its fine leathery petals forming a goblet of the most elegant proportions; but as the day advances it gradually expands, till it becomes nearly flat. Towards evening a faint blush becomes visible in the centre; the petals fall back more and more; and at last, about six o'clock, a sudden change occurs. In a few minutes, the petals, becoming more recurved, arrange themselves in the form of a snow-white hemisphere, whose edge reposes on the water, and the centre rises majestically at the summit, producing a diadem of rosy points. Shortly after, the expansion of the central parts proceeding, these points fall back; the stamens unfold in an interior coronet, the stigmas are laid bare, a grateful perfume rises into the air, and the great object of the flower, the fertilization of the seeds, is accomplished. Then fold inwards the petals, the flower closes, the fairest of vegetable textures becomes wrinkled, decay begins, and the flower stalk withdraws itself beneath the water, as if to veil the progress of corruption.

*New Banksias.**—I lately found the beautiful blood-red *Banksia;* it is allied to *B. verticillata*, having ten to fourteen leaves in a whorl, and is the most beautiful species of this country [Australia]. It well deserves the name of *floribunda*, for when one set of flowers is fully blown, the cone above is prepared to bloom in two or three weeks, and a third in succession, still higher on the branch, is considerably advanced. I hope to send abundance of seeds of this noble *Banksia*, and also of another very fine species, the *B. Brownii* of Baxter, which is verticillate, though not so described by Mr. Brown; its leaves are beautifully pinnate, like those of *B. decurrens*. One species found, during my last excursion, had very large flowers, varying in colour from pale pink to rose, and setaceous glaucous leaves. The natives tell me of a *Banksia* with blood-red flowers, which grows in the interior, and, compared with which, *B. grandis* is but a pigmy. I shall do my best to discover it.—*J. Drummond.*

New Conifers.†—It was on the Rio de los Animos, in Southern California, that Mr. Fendler found his magnificent *Pinus* (Abies) *concolor*, a species as yet unknown in Europe; along with his *P. brachyptera*, which seems to be the same as *P. Benthamiana*. And on the high mountains near the city of Santa Fé, the same traveller found his *Pinus flexilis*, of which the name only has reached us.

Obituary.—December 28th.—Mr. William Loddiges, of Hackney, the last of the old firm of Conrad Loddiges and Sons. Mr. Loddiges has been well known as one of the most persevering cultivators of his day, and a most amiable and kind-hearted gentleman. He was in his seventy-third year. The business now rests in the hands of Mr. Conrad Loddiges, a nephew of the deceased.

* *Gardeners' Chronicle*, 1849, p. 739.

* *Hook, Journ. Bot.*, i., 375. † *Botanical Magazine*, t. 4448.

NEW AND RARE PLANTS.

Macleania cordata, *Lemaire.* Heart-shaped-leaved Macleania.—Nat. Ord., Vacciniaceæ.—Syn., Gaultheria cordata, of *Belgian gardens.*—A fine greenhouse evergreen shrub, growing three to four feet high, with upright smooth branches. The leaves are opposite, oblong-lanceolate, entire, about three inches long. The flowers

grow in a secund manner towards the extremities of the branches, three or four from the axil of each leaf; the corolla consists of an angular tube an inch long, bright red, with a yellow limb of five small, ovate, spreading segments, greenish before expansion.—From Chili: elevated regions in a calcareous stony soil; introduced to Belgium in 1843. Flowers in summer.

Helianthemum scoparium, *Nuttall.* Broom Sun Rose.—Nat. Ord., Cistaceæ.—A small prostrate hardy shrub, suitable only for rock-work, and thriving in the full glare of the sun. The branches are smooth and wiry, and the leaves linear alternate, without stipules. The flowers are small, bright yellow, in twos and threes at the end of the branches; the petals, five in number, are oblong, blunt, wavy, twice as long as the calyx. Readily increased by seeds, and growing in sandy loam and peat.—From California: mountains of Santa Cruz; introduced in 1848. Flowers towards the end of summer. Horticultural Society.

Dossinia marmorata, *Morren.* Marbled Dossinia.—Nat. Ord., Orchidaceæ, § Neotteæ-Physurideæ.—Syn., Cheirostylis marmorata, *Lindley.*—A stove perennial herb, with creeping stems, terminating in tufts of deep reddish olive-green leaves, having a velvety surface, and traversed by golden veins, which, however, to some extent, disappear when the leaves become old. The flowers are small white, with a reddish calyx on a long, purple, downy raceme. Worth cultivating in the orchid-house, on account of the dark, beautifully-variegated leaves. From Java and Borneo; introduced in 1847. Flowers in summer. Mr. Low, of Clapton.*

Blandfordia flammea, *Lindley.* Flame-flowered Blandfordia.—Nat. Ord., Liliaceæ, § Hemerocalleæ.—A showy, greenhouse, herbaceous perennial, growing three or four feet high. The leaves are pale green, linear-lanceolate, from six to nine inches long. The flowers grow in a pendulous manner, on a slender scape, which grows from ten inches to four feet high; the perianth—of six segments, the outer ovate-obtuse, the inner broader—is orange-red, tipped with yellow, the interior a bright orange-yellow.—From Australia, on the banks of the Hunter river; introduced in 1848. Flowers in October. Messrs. Low and Son, of Clapton.†

Berberis aurahuacensis, *Lemaire.* Aurahuacan Berberry.—Nat. Ord., Berberaceæ, § Berberideæ.—A half-hardy, sub-evergreen shrub, with straight erect branches, bearing leaves of two kinds—the lower ones cordate, with a long petiole; the upper ones obovate, elliptical, tapering to the base, coriaceous, wavy, with

a few marginal spiny teeth near the end, and very glaucous on the under surface. The flowers are a very deep yellow, drooping, and grow in compact racemes. From New Grenada: near the village of Aurahuaco-Taquina, in the Sierra Nevada, 9000 feet above the sea, near the snow-line; introduced to Belgium in 1847. Flowers in summer.

* *Ann. de Soc. Roy. Bot. de Gand*, t. 193.

† *Part. Mag. Bot.*, n. s., p. 353.

PELARGONIUM EXIMIUM.

Nat. Order, GERANIACEÆ.—CRANE'S-BILLS. (*Lindl. Veg. Kingdom*).

GENERIC CHARACTER.—*Calyx*, five-partite, the posterior segments produced into a spur or slender nectariferous tube, adnate to the pedicel; *Corolla* of five petals, rarely by suppression four or sometimes two, alternating with the segments of the calyx, clawed, more or less irregular. *Stamens* ten, monadelphous, unequal, those opposite the petals shorter or partly sterile. *Ovaries* five, adherent to the base of the columnar gynophore, one-celled, two-ovulate. *Styles* filiform, rather longer than the gynophore, distinct at the base, adherent to the gynophore, and connate above its summit, free at their apices. *Capsules* five, beaked with the styles, which separate elastically from the gynophore, and become spirally twisted, suspended by these to the summit of the gynophore, or at length deciduous, one-celled, one-seeded by abortion, dehiscing by the ventral suture.

PELARGONIUM EXIMIUM.—Flower of the Day Pelargonium. A garden hybrid, the genealogy of which is too obscure to allow of any satisfactory statement.

DESCRIPTION.—A very showy, half-shrubby perennial, of a dwarf compact habit; stems stout, succulent, and, like the petioles and flower-stalks, clothed with a soft down. Leaves large, somewhat peltate, cordate-orbiculate, about seven-lobed, the lobes crenate; of a fine green colour, with a broad silvery border. Flower-stalks numerous, elongated, bearing large crowded and somewhat globular heads of flowers. Flowers large, of a bright cherry-red colour; the petals wedge-shaped, sometimes slightly excavated at the obtuse summit, veined in the lower half.

HISTORY, &c.—This very handsome plant was raised by Mr. Kinghorn, Gardener to the Earl of Kilmorey, and was produced by crossing Lee's variegated Pelargonium with some of the best green varieties of the section. Mr. Kinghorn believes it to be a cross with Globe Compactum, and states that it may be cultivated as easily as that variety. It does not exhibit any tendency to throw out green shoots. The name of the genus, Pelargonium or Stork's-bill, is derived from *pelargos*, a stork, the immature fruit bearing some resemblance to the head and beak of a stork.—A. H.

CULTURE.—The whole of the Scarlet Pelargoniums are invaluable for flower-garden decoration. For this purpose, their cultivation is very simple. Cuttings are struck in good time during summer, which get well established in separate pots of three inches, or five inches diameter, according as the variety may be a weak or a strong grower; they are topped to produce a dwarf branchy habit of growth; kept growing gently all the summer; well ripened in autumn by limiting their supply of water, and by exposing them as much as possible to bright light; wintered in a light greenhouse secure from frost, but with a low temperature, and with good means of ventilation: shifted about March, and a little excited by being kept somewhat closer, and then gradually hardened off, and finally planted out into the beds or borders as early in May or June as the season will admit, but not until the chances of frosty nights are gone by. This plan secures dwarf, compact plants, suitable for small beds, or for planting towards the margins of larger ones, as they may be kept dwarf, by once or twice topping them in spring. Large plants are to be had by taking up in autumn, before they are damaged by frosts, those plants which have during summer, occupied the garden; putting them into pots as small as will hold their roots with a little soil, placing them in a close frame until established; and wintering them in any dry cool part of the greenhouse which shall secure them against frost. They will lose most of their leaves, but this is of no consequence as their bare branches will become furnished with new shoots and leaves in due time in spring. Such plants, like the others, must be protected by frames, until they can be safely planted out. Any good garden soil, not too rich, but loamy, will suit the Scarlet Pelargoniums, but the winter compost should be a sandy loam with a little leaf mould.

The stronger growing varieties of this race of Pelargoniums including the variety represented in our plate, make splendid conservatory plants when grown to some considerable size. For this purpose, young healthy plants should be selected in July, those having four or five young shoots from near the base being preferred; let them get rather dry, and then cut back the young shoots to within a couple of eyes of the old wood; set them in an exposed place, and give very little water until they have fairly put forth young shoots; then turn them out, shake away the soil from the roots, trim the latter, and repot the plants; set them in a frame

and water them but seldom, until they begin to grow. When they are established and inured to bear exposure in the shade, set them in a sunny exposed place. Rub off all the eyes that break forth except the two strongest and best placed on each shoot, and these should be as equal in strength as possible. When the plants get well rooted, shift them into pots two or three sizes larger than those they are in; thus, if they are in five-inch pots, shift them into nine-inch ones. Keep them in the open air as long as they are safe from frosts; winter them in a greenhouse, placing them in a very light place, and giving water very seldom, so that the soil is often rather dry. When they begin to grow freely in spring, keep the house a little warmer than usual; they must also have much more frequent waterings, but not so as to sodden the soil. Clear weak manure water should be given at every second watering. By this time the branches should be set out at equal distances, by means of small stakes, or strings tied to a band round the pot just below the rim; if this is done while they are young they will set in the position in which they have been fixed, and staking, in the after stages of growth, may be very much avoided. As soon as the trusses of flowers can be discovered, pick out the tips of the shoots above them, which will throw all the strength into the flower heads; in the same way, and for the same reason, laterals should be removed as soon as they can be detected. Plants so treated, flower in May and early in June. By the middle of July, they may be dried off, cut down, repotted, and started again as before for the next season. Plants cut down early in September, and treated in the same way, will flower to succeed the early ones. They should be kept as dormant as possible in winter, and should be shifted early in April, and allowed to grow on to bloom. A third set may be had by stopping back some of the September-cut plants in April, and deferring their shift until they have broken again. The soil for blooming should consist of three parts good loam, two parts decayed cow-dung, two parts leaf mould, and one part of coarse sand, and gritty lime rubbish mixed. In the earlier stages the cow-dung may be omitted.

The smaller growing dwarf sorts may be pruned and potted in the same way, but more shoots should be left, which may be stopped once or twice to produce a bushy growth, after which, the plants must be allowed to grow away for flowering, and require no more topping. They all enjoy, and indeed require, full exposure to light. Cuttings may be readily rooted any time during summer, if planted in sandy compost placed in a shady border, either with, or without a hand-glass.—M.

ON THE CULTURE OF THE VERBENA FOR EXHIBITION.

By Mr. BARNES, Dane Croft Nurseries, Stowmarket.

Verbena. *Lin.* from the Celtic *Ferfaen.—Nat. Order*, Verbenaceæ.

THE Verbena has, within the last few years, become, and most deservedly so, an especial favourite, whether we view it as an ornament to the flower-garden, or to the exhibition; and, although they may be said to flourish and bloom in almost any soil or situation, a little more care and attention is necessary to insure them in anything approaching to perfection, and for this care they well repay the cultivator. It is first absolutely necessary that the plants intended to produce good trusses for exhibition, should be perfectly healthy; that is to say, they should be short-jointed, stout, and with a dark green foliage. In order to obtain plants of this description, I select my cuttings in March, or April, these are struck in gentle heat, potted off into three-inch pots, when rooted, and gradually inured to the climate of a cold pit. At this time they receive their final shift into seven-inch pots, which should be kept as near to the glass as convenient, and frequently well watered overhead. When the plants have been repotted a week or two, they should have the leading shoot pinched out, which causes them to push freely. From plants thus treated I select three or four of the best shoots, depending on the habit of the plants, as some will carry four better than others will carry three; these, whether three or four, should be left equi-distant. The heads of bloom soon appear on these new shoots; but if no exhibition is at hand, the crowns may be again pinched out, the shoots thinned, as before, only permitting the three or four shoots to perfect themselves, and never allowing more than these to bloom on

one plant at a time. By this plan, I have always the same number of shoots in free growth, and the plants very little taller at the end of three months than they were in the first month.

SELECT VERBENAS.

Apolla.	Henriette.	Queen of the French.	Gracieuse.
Beauty of Stow.	John Salter.	Queen of Summer.	Heloise.
Chauvierii.	Madame Laçon.	Saint Margaret's.	Madame Revenchon.
Comte de Paris.	Minerva.	Tricolor.	Baucis.
Defiance.	Mount Ætna.	Comtesse de Mubinon.	Bicolor Grandiflora.
Duchesse de Cazes.	Mountain of Snow.	Ariadne.	General Vandecour.
Eclipse.	Princess Alice.	General Lamoriciere.	La Coquette.
General Brea.	Psyche.		

There are a few varieties better adapted by their natural habit for having the pips thinned out, and this is best done with a pair of sharp-pointed scissors, the thinning operation being performed a few days prior to the day of exhibition, so that the remaining pips may have time to fill up well. These plants will, by the end of July or August, have exhausted the soil, or nearly so, and will no longer furnish good trusses; to remedy this, I strike a fresh stock in June, for the September exhibitions, treating them in every respect as before.

The Verbena should be carefully watched when under glass; the green fly is a great enemy to it, as also is mildew; in either case prevention is better than cure, and an early application of the following, taken in time, will often be the means of saving the plants, when perhaps delays may prove dangerous. The most simple method of destroying the aphis on the plants in pits, or frames, is to place a few hot cinders at the bottom of a seven-inch pot, place tobacco enough on the cinders for the size of the pit, setting the pot at the front part of the pit; shut it up close and cover it with wet mats. The plants must have been in a very bad state indeed, if this does not relieve them.

For mildew the following is a remedy:—On its first approach, make a weak solution of turpentine, with which water them over-head, through a fine rose watering-pot; this should always be done in the evening, and will generally prove effectual.

The soil I prefer is, equal parts of peat, loam, leaf-mould, and charcoal; and of guano a small portion—the guano well pounded, the others as rough as possible.

By following the above plan, and selecting plants from the List above, the Verbena may be exhibited in such a manner as cannot fail to make it a general favourite at the summer and autumn exhibitions.

COVERING IN ITS GENERAL APPLICATION TO GLAZED AND OTHER HORTICULTURAL STRUCTURES.

By Mr. GEORGE SMITH, Brooklands Nursery, Blackheath.

A MORE appropriate season than the present cannot well be chosen for the consideration of this important subject, the more especially as gardeners and amateurs, frequently at the eleventh hour, have to apply materials of various descriptions, some of which are not adapted to the purpose, and in some cases turn out totally ineffective. It is, therefore, desirable to be prepared to determine which are the proper materials for the purpose, and what is the most effective method of applying them.

Dr. Wells, in his very admirable essays on the formation of dew and hoar-frost, found that a cambric handkerchief, suspended a few inches above a thermometer placed upon a grass-plot, kept it, on a still night, several degrees higher than another thermometer which was fully exposed; and we all know very well that the intervention of a cloud on a frosty night will prevent one place from being affected by frost, while another garden, not a very great distance off, but not so protected, will suffer severely. And why is this? Because the handkerchief and the cloud alike prevented the radiation of heat into space, and therefore, being confined about the plants, prevented their being injured. Finding, then, that so slight a fabric as a thin handkerchief, or a filmy cloud, makes so great a difference in the open air, what an important advantage it would be to use a proper covering for our forcing-houses in severe weather. As to the best material to use for the protection of our houses, and frames, there is great diversity of opinion. Mats have been used for a great number of years, and are still very much esteemed by some cultivators, though, for my own part, I have always been opposed to their use. They are extremely expensive, and after a few months' use are by no means effective. Their being non-conductors of heat certainly recommend them, but they are by no means durable, neither are they effective in severe frosts, unless used in larger quantities than most gardeners can command. The late

Mr. London considered that four thicknesses of woollen netting would make an excellent covering, providing that the first net was kept an inch from the glass, and the next an inch apart from the first, with the meshes crossed, and so on. This, no doubt, would answer the purpose in calm weather, but wind-frosts would unquestionably penetrate through many such fabrics. There is another and a graver objection to them: they would be extremely difficult to apply, though the material is the very best for the non-conducting of heat, and, consequently, the most useful for protective purposes—that which is best calculated to confine and prevent the escape of heat from hothouses having always been found the most effective against the ingress of frost. The suggestion thrown out by this great and scientific man for keeping the covering in non-contact with the glass is excellent; air is a very bad conductor of heat, therefore a confined stratum, being kept between the glass and the covering, answers the double purpose of preventing the heat from escaping by conduction, and reflects it back into the pit or structure. For this reason I have used, for some years, strong waterproof canvas, which, when properly applied—that is, supported an inch or so above the glass—will, for ordinary purposes, answer every expectation. If, in severe weather, extra covering be found necessary, any light material, such as straw or fern fronds, may be used. One great advantage of these covers, especially in windy weather, is, that they are perfectly secure; for, being fastened over at the sides, no wind will remove them, and we can retire to rest, feeling assured that our pits and houses will not be stript of their covering before the following morning. Another advantage of this covering is, that on cold rainy nights the rain does not pass through them, carrying away the heat as it runs down the glass,—a fault with most covers. This sort of covering has the disadvantage of expense in the first outset, but being, with proper management, very durable, it will be found much cheaper, on an average of seven or ten years, than mats. The immense advantage of covering the roofs of houses devoted to the forcing of grapes, peaches, cucumbers, or flowers, will, I feel confident, be readily admitted by those who have had to contend with severe frosts and strong winds, in winter and the early spring months, even if they have had a heating apparatus of the best possible construction. With a pully or two, a roller, and a piece of strong cord, there is no great difficulty in using canvas for this purpose. Wooden shutters, made of thin deal boards, at a trifling cost, and hung upon moveable hinges along the front sashes, would secure the whole surface of glass, which must otherwise be exposed to every blast that blows. These wooden shutters, in my opinion, make by far the most durable, effective, and the cheapest covering for pits and frames of every description. They possess other advantages over canvas. Any quantity of litter or other material may be strewn over them, in necessary cases, without pressing them in contact with the glass, which, if done, would give facility to the escape of heat or the ingress of frost, and place the glass in danger of being broken. I used, some years ago, woven straw mats; they are effectual, but expensive, and by no means durable.

Since writing the above, I have seen some of the waterproofed cloth manufactured by Mr. S. Yexley, of Merton, Surrey. One sample is as pliable as a glove, perfectly waterproof, and very strong, and may be worked in any lengths of from ten to one hundred feet.

PROFESSIONAL AND MORAL TRAINING.—No. I.

HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey."

WITH Gardeners as with all other men, circumstances will materially influence what is useful and what is useless knowledge; but, nevertheless, there are subjects, elementary and practical, that are generally, I may say universally, necessary to be learned and understood by all Gardeners who are desirous of advancing in their profession; and these I will attempt to describe to my young readers.

In this, my first communication, the desire of being useful prompts me to direct you, in the best manner I am able, how you are to proceed in acquiring useful knowledge, that is, the knowledge most necessary for your advancement in the gardening profession. If your school education has been neglected, you must first make amends for that neglect. But I will presume that this has not been the case. Now that you have arrived at an age when it is your duty as well as your desire and interest to seek employment and improvement in a distant part of the country, I would strongly urge you to keep your eyes and ears open, in order to see and to hear everything useful for your advancement in life. You have been fortunate, by the kindness of friends, to obtain employment in a place where the operations of Gardening are carried on in every department. You had opportunities, when at ——, of seeing the general routine of gardening work—that is, something of everything. *Now* is your time to profit by

what you there saw, and what you will now see daily performed. The difference of climate, the varieties of soil—natural and artificial—and the many systems of growing the same thing, will suggest instructive observations to an attentive and inquiring mind.

Without attention to what you see and do, no advancement can be expected. I advise you, from many years' experience of its advantages, to be particular in keeping a memorandum-book, beginning now with the new year, having the months and days of the whole year marked off upon it for the purpose of noting down every evening the work performed in the garden during the day, with your own remarks on the same, and any other observations that your reading, conversation, or reflection may suggest. I am so convinced of the utility of the practice, that I assure you, without it all your recollections will be doubtful, unsatisfactory, and most probably useless. It will, however, be waste of time and of paper for me to point out the utility of such a practice, unless your own interest and good sense influence you to act upon it. Be assured that I have no object in view but your own interest and advancement; therefore do not neglect it.

The life of a gardener should be devoted to observations on the broad and extended field of Nature, in which the various productions of the vegetable world are constantly before his eyes. In the course of these hints I shall more particularly describe them; but for the present it is best to direct your attention to the daily operations performed in the garden, and to induce you to note down the progress that vegetation is making there, and in its neighbourhood. My meaning is, that when you have taken memoranda of the days on which vegetation begins to bud forth from the plants, fruit trees, and vegetables, either forced or growing in the open air, you should extend your walks to the shrubberies, pleasure-grounds, and woods, to observe the progress that vegetation is making there. It is a great object to know the order of succession of flowers and foliage, this knowledge being necessary to keep the flower-garden gay, the pleasure-grounds interesting, and the woodlands ornamental. Unless we take observations of these things, we can never be able to arrange our materials in such order that their various seasons of expanding their foliage and flowers, would contribute to diversify the scene, and produce a regular succession of pleasing objects. With that knowledge, a gardener can so dispose his plants, shrubs, and trees, that beauty and variety would be produced by the early flowers and tender foliage of spring, by the more numerous blossoms and mature foliage of summer, by the varying colours, tints, and shades of autumn, and by the evergreen foliage even in the dull days of winter. Without making observations, and taking notes of these things as they appear, all will be chance-work and confusion. Pray, give yourself that little trouble, and you will find the use, benefit, and advantage of it at a future day.

Reviews, and Miscellaneous Notices.

REVIEW.

Aspects of Nature in different Lands and different Climates, with Scientific Elucidations. By A. Von Humboldt. Translated by Mrs. Sabine. London, Longman and Murray. 2 vols.

Among the books for the stay-at-home traveller who, sitting by his own fire-side, wishes to explore with another's eyes the wondrous works of Nature displayed on this globe of ours, there have been few which have such claims as the work before us. Not only does it give us vivid pictures, painted as Humboldt alone can paint, of the grander features of natural scenery, but we are taken into all the side-passages, all the penetralia, which science has revealed, and instructed in the meaning, the laws by which the phenomena are regulated, and the general principles that are to be deduced from the varied observations.

The author tells us in the Preface that the present work is

"A carefully prepared and executed attempt to enhance the enjoyment of Nature by animated description, and at the same time, to increase, in proportion to the state of knowledge at the time, the reader's insight into the harmonious and concurrent action of the different powers and forces of Nature."

And he adds:

"In my eightieth year, I am still enabled to enjoy the satisfaction of completing a third edition of my work, remoulding it entirely afresh, to meet the requirements of the present time."

A comparison of the present volumes with the preceding German edition of the work enables us to bear testimony to the care with which this remoulding has been performed. It is a pleasant thing to contemplate the satisfaction with which an ardent votary of science, like Humboldt, must have applied himself, still in the full enjoyment of all those brilliant faculties which placed him in the front rank of scientific observers more than half a century ago, to the revision of an earlier work, written with the express purpose of opening his great stores of information before the wider audience of the general public, and spreading a taste for his favourite studies beyond the circle of professed *savans*.

The essays, or picturesque description, which form the main feature of the work, are very interesting, and calculated to produce a clear impression of the peculi-

arities of the various regions of nature, or classes of phenomena, of which they treat; but the English reader will, in some cases, perhaps, find traces of the peculiar character which distinguishes what is considered the "classic" style of German composition, and which often appears rather inflated to us. This is no fault of the translator, who has executed her part admirably, since it does not lie in mere idiomatic phrases, but in the general style; and it requires, therefore, that we should remember that the author wrote the work for a German public, and consequently adopted the peculiarities of his national literature.

The notes and annotations are, to us, the most pleasing portion of the work, not only as being free from the peculiarities of style just alluded to, but as containing such a mass of information on such a variety of subjects. Each of them is a little sketch of a particular subject, giving all the information we at present possess on it; so that we may take up the volumes at any spare moment, and find a short account of some interesting question, serving at once either as a means of acquiring a certain amount of definite knowledge, or, by the references to authorities, as a guide in the prosecution of further study.

With these remarks we will pass to some of the subjects which promise to be most attractive to our readers; and of these we shall scarcely find one of greater interest than the note on "the cultivation of farinaceous grasses:"—

"The original habitat of the farinaceous grasses is wrapped in the same obscurity as that of the domestic animals which have accompanied man since his earliest migrations. The German word for corn, "getreide," has been ingeniously derived, by Jacob Grimm, from the old German gitragida, getregede. 'It is, as it were, the *tame* fruit (fruges, frumentum) which has come into the hands of man; as we speak of tame animals in opposition to wild ones.'—(*Jacob Grimm, Gesch der deutschen Sprache*, 1848, i., 62). It is certainly a very striking phenomenon, to find on one side of our planet nations to whom flour or meal, from small-eared grasses (*Hordeaceæ* and *Avenaceæ*), and the use of milk were completely unknown, while the nations of almost all parts of the other hemisphere cultivate the cerealia, and rear milk-yielding animals. The cultivation of different kinds of grasses may be said to afford a characteristic distinction between the two parts of the world. In the New Continent, from 52 deg. north to 46 deg. south latitude, we see only one species cultivated, viz., maize. In the Old Continent, on the other hand, we find everywhere, from the earliest times of history, the fruits of Ceres, wheat, barley, spelt or red wheat, and oats. That wheat grew wild in the Leontine fields, as well as in several other places in Sicily, was a belief entertained by ancient nations, and is mentioned by Diodorus Siculus (Lib. v., pp. 199 & 232. *Wessell*). Ceres was found in the Alpine meadows of Enna, and Diodorus fables that "the inhabitants of the Atlantis were unacquainted with the fruits of Ceres, because they had separated from the rest of mankind before those fruits had been shown to mortals." Sprengel has collected several interesting passages, which led him to think it probable that the greater part of our European kinds of grain were originally wild in the northern parts of Persia and India, namely, summer wheat in the country of the Musicanes, a province in Northern India (*Strabo*, xv., 1017); barley ("antiquissimum frumentum," as Pliny calls it, and which is also the only cereal with which the Guanches of the Canaries were acquainted), according to Moses of Chorene (*Geogr. Armen. ed Whiston*, 1736, *p.* 360), on the Araxes or Kur in Georgia, and, according to Marco Polo, in Balascham in Northern India (*Ramusio*, vol ii, 10); and spelt or red wheat near Hamadan. But these passages, as has been shown by my keen-sighted friend and teacher Link, in an instructive critical memoir (*Abhand de Berlin Akad.*, 1816, p. 123), still leave much uncertainty. I also only regarded the existence of originally wild kinds of grain in Asia as extremely doubtful, and viewed such as might have been seen there as having *become wild* (*Essai sur la Geogr. des Plantes*, 1805, p. 28). Reinhold Forster, who, before his voyage with Captain Cook, made, by order of the Empress Catherine, an expedition into Southern Russia for purposes of natural history, reported that the two-stalked summer barley (Hordeum distichon), grew wild near the junction of the Samara and the Volga. At the end of the month of September, 1829, Ehrenberg and myself on our journey from Orenburg and Uralsk to Suratow and the Caspian, also herborised on the banks of the Samara. We were indeed struck with the quantity of wheat and rye plants growing in what might be called a wild state in the uncultivated ground; but the plants did not appear to us to differ from the ordinary cultivated ones. Ehrenberg received from M. Carelin a kind of rye, (Secale fragile), gathered on the Kirgis steppe, and which Marschall von Biebierstein regarded for a time as the original or mother plant of our cultivated rye (Secale cereale). Although Olivier and Michaux speak of spelt (Triticum spelta) as growing wild at Hamadan in Persia, Achille Richard does not consider that Michaux's herbarium bears out this statement. Greater confidence is due to the most recent accounts obtained by the unwearied zeal of a highly-informed traveller, Professor Carl Koch. He found much rye (Secale cereale, *var. b.* pectinata), in the Pontic Mountains, at elevations of upwards of five or six thousand feet, in places where within the memory of the inhabitants no grain of the kind had ever been cultivated. Koch remarks, that the circumstance is 'the more important, because with us this grain never propagates itself spontaneously.' In the Schirwan parts of the Caucasus, Koch collected a kind of barley, which he calls 'Hordeum spontaneum,' and considers it to be the originally wild 'Hordeum zeocriton' of Linnæus (*Carl Koch Beitrage zur Flora des Orients.* Part i., pp. 139 & 142.)."

We may add to this, that Prof. A. Decandolle has, in a late number of the *Bibliotheque Universelle* of Geneva, expressed himself in favour of Prof. C. Koch's views, and considers that he has fully made out his case.

The author adds, that wheat was first cultivated in New Spain by a negro slave of the great Cortes. He had found three grains of it amongst the rice which had been brought from Spain for the provision of the army. The first wheat sown at Quito was by a Franciscan monk, Fray Jodoco Rixi, a native of Ghent. Humboldt saw, in the Franciscan Convent at Quito, the earthen vessel which had contained the wheat, preserved as a relic.

"The first sowing had been made in front of the convent, on what is now the Plazuela de San Francisco, after cutting down the forest which then extended from the foot of the volcano of Pichincha to the spot in question. The monks, whom I often visited during my stay at Quito, begged me to explain to them the inscription on the earthen vessel, which they thought must contain some mystic reference to the wheat. I read the motto, which was in the old German dialect, and was—"Whoso drinks from me, let him not forget his God." I, too, felt with the monks, that this old German drinking vessel was a truly venerable relic. Would that there had been preserved everywhere in the New Continent the names, not of those who made the earth desolate by bloody conquests, but of those who first intrusted to it these its fruits so early associated with the civilization of mankind in the Old Continent."

In the second volume we meet with a brief notice of a scarcely less important plant:—

"My old friend, Colonel Acosta, in his instructive work entitled *Compendio de la Hist. de la Nueva Granada*, p. 185, endeavours to prove, by means of the Chibcha language, that 'potatoes (Solanum tuberosum) bear at Usmè the native non-Peruvian name of Yomi; and were found by Quesada already cultivated in the province of Velez as early as 1537, a period when their introduction from Chili, Peru, and Quito, would

seem improbable, and therefore that the plant may be regarded as a native of New Granada. I would remark, however, that the Peruvian invasion and complete possession of Quito took place before 1525, the year of the death of the Inca Huayna Capac. The southern provinces of Quito even fell under the dominion of Tupac Inca Yupanqui at the conclusion of the fifteenth century' (*Prescott, Conquest of Peru*, vol. i., p 332). In the unfortunately still very obscure history of the first introduction of the potato into Europe, the merit of its introduction is still very generally attributed to Sir John Hawkins, who is supposed to have received it from Santa Fé in 1563 or 1565. It appears more certain that Sir Walter Raleigh planted the first potatoes on his Irish estate near Youghal, from whence they were taken to Lancashire. Before the conquista, the plantain (*Musa*), which, since the arrival of the Spaniards, has been cultivated in all the warm parts of New Grenada, was only found, as Col. Acosta believes, at Choco."

For the present we must defer the continuation of our pleasant task. We shall, however, hereafter, enter into some of the questions touched on in the essay on the "Physiognomy of Plants."

HORTICULTURAL SOCIETY.

JAN. 15.—Owing to the severity of the weather, but few subjects were submitted for exhibition. The only plants shown, were a Chorozema and an Orchid; the former, from Messrs. E. G. Henderson, of Wellington Road, St. John's Wood; the latter—a small species of Odontoglossum—from Messrs. Jackson, of Kingston. Messrs. Henderson's Chorozema is a distinct and neat-looking species, of slender habit, with leaves something like those of C. ilicifolia, and clear yellow blossoms; it was called C. flava, and when well grown, will prove an acquisition.

Of fruit, three remarkably fine baskets of West's St. Peter's grape, with two splendidly preserved bunches of the Muscal of Alexandria, were sent by Mr. Davis, of Oak Hill, East Barnet, for which a certificate of merit was awarded. We have rarely seen grapes in January in a finer state of preservation. From Messrs. Paul and Son, of Cheshunt, were a collection of fifty varieties of apples, some of them in fine condition; among which, Fearns Pippin, Court pendu Plat, Wellington. Bess Pool, and Small's Admirable, a very handsome apple, were the most remarkable. The same gentleman also contributed a collection of ten kinds of pears, several of them with old faces, bearing new names. We should notice the fruit more in detail, if the means of speaking positively in the matter was afforded us; but we wish to guard ourselves against recommending fruit from external appearances only.

Of miscellaneous articles, two kinds of label, for naming plants, were exhibited. One of these—a novelty—was made of Gutta percha, with a kind of "metalized" surface, the names being in relief. Two forms of this label were produced,—one an oblong tablet, intended to be used with a stalk to thrust into the soil; the other crescent-shaped for suspension. In the samples produced the names were not sufficiently distinct; but in this respect, they may admit of improvement. They were invented by Mr. Little, of Larkhall, near Bath, and were communicated by Mrs. Loudon.

The other kind was a zinc label with prepared cloth for writing on, this being covered by a slip of glass; they were sent by Mr. Morrell of Fleet Street, London.

NOTICES.

*Primæval Vegetation.**—The olive-leaf which the dove brought to Noah established at least three important facts, and indicated a few more. It showed most conclusively that there was dry land, that there were olive trees, and that the climate of the surrounding regions whatever change it might have undergone, was still favourable to the development of vegetable life; And, farther, it might be very safely inferred from it that, if olive trees had survived, other trees and plants must have survived also; and that the dark muddy prominences round which the ebbing currents were fast sweeping to lower levels, would soon present, as in antidiluvian times, their coverings of cheerful green. The olive leaf spoke not of merely a partial, but of a general vegetation. Now the coniferous lignite of the lower old red sandstone we find charged, like the olive leaf, with a various and singularly interesting evidence. It is something to know that, in the times of the Coccosteus and Asterolepis, there existed dry land, and that that land wore, as at after periods, its soft, gay mantle of green. It is something also to know, that the verdant tint was not owing to a profuse development of the mere immaturities of the vegetable kingdom—crisp, slow-growing lichens, or watery spare-propagated fungi that shoot up to their full size in a night—nor even to an abundance of the more highly organized families of the liver-worts, and the mosses. These may have abounded then, as now; though we have not a shadow of evidence that they did. But while we have no proof whatever of their existence, we have conclusive proof that there existed orders and families of a rank far above them. On the dry land of the lower old red sandstone, on which, according to the theory of Adolphe Brongniart, nothing higher than a lichen or a moss could have been expected, the ship-carpenter might have hopefully taken axe in hand, to explore the woods for some such stately pine as the one described by Milton:—

> Hewn on Norwegian hills, to be the mast
> Of some great admiral."

Different Berries in the same Bunch of Grapes.—In the autumn of 1846, I found, near Mersberg, bunches of grapes bearing, at the same time, on one side, white Burgundy, and on the other red Rülander, or even red Rülander and black Burgundy; the berries, therefore, were different in colour, size, and flavour. The cause of this phenomenon was, that the three kinds of grape in question were planted side by side in continuous rows, so that the pollen might easily be carried from the flowers of one to the stigmas of the others. Among other circumstances which warrant this explanation is the fact, that sometimes half, sometimes a third, or even a quarter, of the berries of a bunch belonged to the different sorts, and that these occurred on that side of it next the plant of that kind.—*M. Jack, in The Flora.* [The same thing we have seen at Stradsett Park, Norfolk, A seedling vine raised there produces both black and white grapes on the same bun ; but they are worthless. It is, therefore, very doubtful whether the transmission of polen had anything to do with the change of colour.]

* Miller's *Foot-prints of the Creator.*

NEW AND RARE PLANTS.

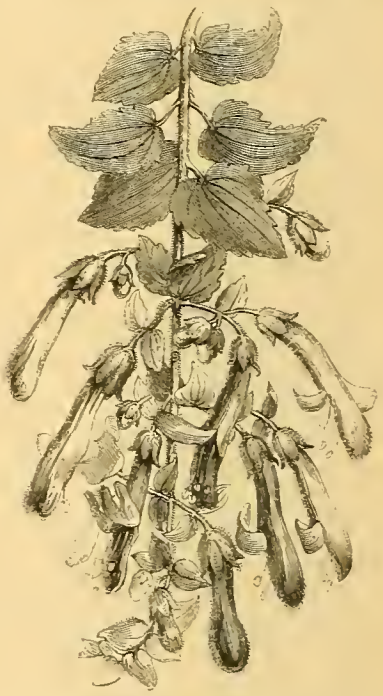
Metrosideros tomentosa, *Richard.* Downy-leaved Metrosideros, (*Bot. Mag., t.* 4488).—Nat. Ord., Myrtaceæ, § Leptospermeæ.—A showy, large-growing, evergreen greenhouse shrub, with copious, compact, but spreading ramifications. The leaves are opposite, leathery, elliptical obtuse, ovato-lanceolate, or lanceolate-acute,

dark green and smooth above, whitish and downy beneath. The flowers the conspicuous part of which consist of the bright red filaments of the stamens—grow in corymbs at the end of the branches.—From New Zealand: the rocky sea-coast and shores of the Bay of Islands; introduced by Mr. Allan Cunningham, before 1839. Flowers in summer. Royal Garden, Kew.

Pharbitis limbata. *Lindley.* White-edged Pharbitis, (*Journ. Hort. Soc.*, v. 33).—Nat. Ord., Convolvulaceæ, § Convolvuleæ.—A very handsome stove-climber, with the appearance of the Convolvulus major. The stems are clothed with retrorse hairs. The leaves are cordate entire three-lobed, and hairy. The flowers are solitary from the axils of the leaves on very short stalks; the sepals very long, linear-acute, excessively hairy; the corolla intense violet, edged with pure white. The flowers are very beautiful. From Java; introduced in 1849. Flowers in summer and autumn. Messrs. Rollisson, of Tooting.

Calboa globosa, *Lindley.* Globose Calhoa. (*Journ. Hort. Soc.*, v., 83).—Nat. Ord., Convolvulaceæ, § Convolvuleæ. Syn., Quamoclit globosa, *Bentham;* Morenoa globosa, *Llave and Lexarza.*—A strong-growing, half-woody, smooth-stemmed, climber, requiring much room to spread, and to be kept in a cool, dry stove in winter, and in a cool greenhouse in summer. The leaves are thin, variable in form, cordate-acuminate, sagittate or hastate, with the lobes narrow, and the lower ones deeply angular. The flowers grow on axillary umbels on a long peduncle; the sepals have a subulate process at the back; the corolla is deep rich red; the tube curved cylindrical; the limb campanulate.—From Mexico: eastern declivity of Orizaba; introduced in 1846. Flowers from August to October. Horticultural Society.

Pentstemon cordifolius, *Bentham.* Heart-leaved Pentstemon. (*Journ. Hort. Soc.*, v. 88.)—Nat. Ord., Scrophulariaceæ, § Antirrhinideæ.—A pretty half-shrubby hardy plant of spreading habit, having downy stems. The leaves are small, green, shining, cordate serrate. The flowers grow in large leafy one-sided panicles at the end of the shoots; the calyx is covered with glandular hairs; the corolla nearly an inch and a half long, the



tube almost cylindrical, the upper lip straight, the lower lip three parted; colour, a "rich dull red." Suitable for rock banks or against a wall.—From California: mountains of Santa Cruz; introduced in 1848. Flowers from June to October. Horticultural Society.

Spathoglottis aurea, *Lindley.* Golden Spathoglottis, (*Journ. Hort. Soc., v.* 34)..—Nat. Ord., Orchidaceæ, § Epidendreæ-Bletidæ.—A handsome, terrestrial, stove orchid, with broadly, lance-shaped leaves, and a scape two feet high, bearing at the end about half-a-dozen large golden yellow flowers, with a few dull, sanguineous spots on the lip.—From Malacca: rocks on Mount Ophir; introduced in 1848, by Mr. T. Lobb. Flowers in autumn. Messrs Veitch and Son, of Exeter.

J. Holden Sc

Calceolaria flexuosa.

CALCEOLARIA FLEXUOSA.

Nat. Order, Scrophulariaceæ.—*Sub. Order*, Antirrhinideæ ? Calceolarieæ.

Generic Character.—Calceolaria, *Linn.* *Calyx* sub-adherent for a very short space, to the base of the ovary, four-partite, the lobes valvate in æstivation. *Corolla* sub-perigynous, with scarcely any tube, the limb concave, two-lobed, lobes entire, concave, or slipper-shaped, the upper smaller, in æstivation closely covering at the margins the lower, which is usually inflated. *Stamens* two, lateral, inserted near the base of the corolla, a third posterior stamen very rarely added, no rudiments of those suppressed. *Anthers* two-locular or dimidiate. *Style* simple, with a minute stigmatic surface at the unthickened apex. *Ovary* seated on a slender disk, adnate to the calyx. *Capsule* ovate-conical, bursting septicidally, the two-fid valves with inflected margins separating from the placentiferous column. *Seeds* several, very often numerous, striated. (Benth. *in D. C. Prod.* x. 204.)

C. flexuosa, *Ruiz and Pavon.* — Flexuose Slipperwort. Shrubby, villous, branches flexuose, cordate-ovate, acute, erenato-serrate, rough above, mealy and veined beneath, paniele corymbose; calyx villous, with rather acute teeth, corolla of one colour, the upper lip shorter than the calyx, the inferior broadly-obovate patent, with the base contracted for some distance, open in the middle.

Synonym.—Ruiz and Pavon. Fl. Peruv. et Chil. i. 17, t. 26 f. a.—Coll. Lobb. No. 343.

DESCRIPTION.—Shrubby, herbaceous, from two to three feet high, erect, with flexuose, villous branches. Leaves cordate-ovate, sometimes acute, or rather acuminate, coarsely crenate-serrate, rough above, whitish, mealy, and veined beneath, shortly stalked. Calyx of four broadly ovate, villous, spreading, rather acute teeth; corolla calceolate-bilabiate, large, yellow, the upper lip shorter than the calyx, the lower contracted below, broadly obovate, inflated, patent, open about the middle. Stamens two, very short, inserted near the base of the corolla, filaments very short, anther two-celled, the two cells in contact above, and diverging widely from each other and from the filament below, opening by marginal slits, deflexed after bursting; ovary conical, on a slender disk, adherent at the base to the calyx; style linear, simple, somewhat arcuate; stigma an oblique surface; capsule ?

History, &c.—The accompanying figure is from a plant raised by Messrs. Veitch & Son, of Exeter, from seed sent home by their collector, Mr. W. Lobb, in 1847. It was gathered in the mountains near Andaylis, Peru, at an elevation of 8,000 feet. It has not yet been exhibited, and was supposed to be new; but a dried specimen, sent to Sir W. J. Hooker, was determined by him to be the *C. flexuosa* of Ruiz and Pavon. The figure in the *Fl. Peruv. et Chil.* gives a very unsatisfactory view of the flower; but the leaves and habit appear to me to represent the present species. It may be remarked, that, in *De Candolle's Prodromus*, the sepals are said to be rather obtuse, as they are in our figure from a garden specimen; but in the dried specimens, transmitted with the seeds from Peru, they are acute, as represented by Ruiz and Pavon.—A. H.

Culture.—The subject of our illustration must be a very ornamental plant for the summer flower-garden, as it produces its showy blossoms in clusters of immense magnitude. It will probably be a fine plant for large beds, if it possesses the quality of many others of this genus —continual blooming. The Calceolarias like a rich light loam, and plenty of support from weak manure water during dry weather. They are propagated by cuttings of the non-flowering shoots; and these should be planted very late in the season—not before the end of September—in a close frame, in which they will root very freely; whilst, if planted earlier, it is often difficult to get them to root kindly. The plants must be wintered in a greenhouse, on a light shelf, or in a well ventilated pit, secure against frost. They are particularly liable to suffer injury from attacks of green fly during winter and spring, unless kept carefully clear of such intruders.

It is probable that, for flower-garden purposes, this species, being a strong grower, may require some peculiar modification of soil to bring out its characteristic feature of dense masses of flowers, and, at the same time, check exuberance of vegetative growth. A hint may be taken from its being found, as it is said, growing among the débris of rocks, to give it a very porous soil, among which such absorbent materials as broken bricks and sandstone are freely intermixed. Such materials, while they naturally check rank growth, are yet favourable to the application of liquid manure, if, from the exigencies of the season, the plants should be found to require such support.

The name Calceolaria is derived from *calceolus*, a slipper, in allusion to the form of the corollas: hence the plants are called slipper-worts.—M.

Vegetable Physiology.

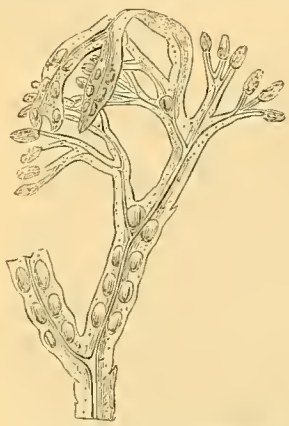
By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

PHYSICS OF VEGETATION.

IN accordance with the plan stated in the preceding paper, I shall first direct attention to the principal physical phenomena, which we shall always have to bear in mind when inquiring into questions of vegetable physiology.

These will be examined most satisfactorily if we take them in the order of the relative position of the different forces acting in nature. The first and simplest of these is the force of gravity, which, passing over its influence in astronomical questions, is exhibited upon the earth in the effect of what we call weight. All the particles of the matter composing the earth, and the various bodies upon its surface, are always subject to an attraction toward the centre of the earth; and, as the particles are all equally attracted, bodies will be more forcibly drawn toward the centre, in proportion to the number of particles of which they are composed. Thus a pound weight made of brass will be attracted more strongly to the centre than an ounce weight of the same metal, because the first is composed of a greater number of particles; being thus more strongly attracted, we say, in common language, it has more weight, or is heavier. But there is another point to be noticed of more importance to us in our present study, viz., the difference of weight arising from difference of *density*. A bottle filled with sand is heavier than when it is filled with water; and the explanation of this is, that the sand is a denser substance than water, which means, that the particles in the sand being closer together than those of the water, there are a greater number of them contained in the same space. This difference of density produces what is called the *specific gravity*, or *specific weight*, of substances, which is the weight of equal bulks of bodies of different densities, in proportion to a fixed standard, such as that of the weight of a fixed bulk of water. Solids are more dense than liquids, liquids than gases or air. The practical conclusions to be drawn from these statements are chiefly of importance in examining the mode of distribution of the nutrient fluids in plants, since we thus understand why any cause which increases the *density* of a fluid will give it a tendency to *descend* in the structures.

The general phenomena resulting from the action of gravity are familiar to every one, and require but a few remarks. It may be worth while, however, to mention one or two points which strikingly illustrate the peculiar relation of vegetables to the physical force of gravity. Vegetables, as complete bodies, can only resist the force of gravity by mechanical means, and have (or in only a very few exceptional cases) no power of opposing a voluntary force to it, as animals do in their movements by means of their muscles. The rigidity, toughness, or mechanical strength of their structures, is the power which enables most plants to sustain weight, and we see this strikingly exhibited in trees, which are built up with the most beautiful mechanical perfection of arrangement. The pyramidal form of the trunk, with its spreading roots, in the Dicotyledonous tree, the pyramidal collection of roots successively developed like so many slanting props or stays around the base of the tall slender Palm, are examples which at once present themselves to us. On the other hand, when the rigidity is wanting, the weight of the upper part of the plant either causes it to lie prostrate, or requires that it should be attached to some extraneous support. In aquatic plants, which are generally of very delicate structure, the mechanical adaptations are not less striking. Plants, so soft and weak that they fall into a confused entangled mass when lifted into the air, are buoyed up in water, as a much denser fluid than air; partly, from the fact that the *specific gravity* of their structures is of very little more *specific gravity* than the water, and so they do not readily sink in it, and partly by the contrivance of swimming bladders, as it were, consisting of hollow spaces filled with air, which, tending to rise like bubbles in the water, float up the structures which inclose them. We find examples of the first in all the more delicate filamentous or membranous Algæ, and, of the latter, perhaps the most striking instances are furnished by the Bladderwrack (*Fucus vesiculosus*) occurring in all our seacoasts, and by the *Utricularia*, or Bladderwort, the leaves of which are furnished with a number of little hollow receptacles containing air. Air chambers, consisting of regular or irregular closed cavities are also found almost universally on the stems and leaves of floating aquatic plants, sometimes exhibiting great regularity in their arrangement.



BLADDERWRACK (FUCUS VESICULOSUS).

These facts show us that it is principally by means of mechanical strength, or contrivances for lessening the specific gravity of the entire structure, that plants resist the attraction drawing them toward the surface of the earth; but when we come to consider the condition of the fluids, the juices of vegetables, we meet with certain other forces acting in opposition to the mere weight, and performing a very important part in the distribution of the saps through the various parts of the plant. The two most remarkable of these are *capillary attraction* and *endosmose*.

Capillary attraction.—Every one must have remarked, that when a piece of sugar or of sponge is laid upon a wet surface, the liquid rises up and wets these substances throughout; and we find the same thing to occur in all porous bodies, when placed in contact with a liquid capable of wetting them. The phenomenon is most distinctly exhibited by dipping the end of a fine glass tube into water, when we see the liquid rise to a level inside the tube, higher than that of the surface in the vessel holding the water. Very thin tubes, like those used in such experiments, are termed *capillary*, or hair-like, from *capilla*, a hair; and hence this power which they possess of drawing up, as it were, the liquid within them, is called capillary attraction. Examples of this attraction are furnished by a great number of objects in daily use: thus, in a lamp, the oil or spirit is drawn up in the wick by the attraction exerted in the little interspaces between the fibres of the cotton, which act as capillary tubes; the interspaces of the porous sugar and sponge, before alluded to, act in the same manner; and porous earthy substances, such as coarse unglazed pottery, or pumice stone, afford other examples. Vegetable structures, which are so very porous and spongy, may naturally be expected to exhibit capillary attraction in a striking manner, and it does undoubtedly play a considerable part in the transmission of fluids through them. Its action in such structures may be well demonstrated by dipping one end of a piece of cane into turpentine, and, shortly after, applying a light to the other end, the turpentine will rise in the capillary tubes which run through the cane, and take fire and burn at the top. We learn another fact, too, from this experiment, namely, that the rise of fluids in the interior of plants may be the result of a physical force, and not immediately of the vital power of the plant. Capillary attraction is most influential in the higher plants—in those which have stems built up of delicate woody tubes; and there is no doubt that it is a most active agent in effecting the rise of the sap in trees. It is not necessary for us here to enter into the philosophical theories by which this attraction is accounted for. They involve some rather abstract considerations, which would be out of place here, and it is sufficient for the subject we have in hand to know that it is an universal phenomenon.

Endosmose.—The other force which has been spoken of is, probably, dependent fundamentally upon somewhat analogous causes; but here again I shall confine myself to a statement of the general and well-ascertained facts. The capillary attraction we found to be exerted by bodies capable of *being wetted* by the liquid; for, where this is not the case, as with a glass tube when dipped into quicksilver, no attraction, but actually a repulsion and depression of the level is produced. This capability of being *wetted* is evidently dependant on a peculiar attraction, similar to that which causes certain liquids to mix intimately with each other, like spirit and water; while others, such as water and oil, repel each other, and remain separate.

When we place a thin plate of any porous substance between two liquids which will readily mix with each other, but of which one will *wet* the porous substance through more readily than the other, we find that the former passes through more quickly than the latter. For example, a piece of bladder is readily wetted through by water, but not so by spirit; if we tie a bladder over the end of a piece of tube, or the glass chimney of a lamp, pour spirit into this so as to fill it up to a certain mark, and then immerse the lower end in water, the water will penetrate the bladder, which it readily wets, and then meeting with the spirit, mixing with this, will cause the level inside the tube to rise till the mixture of the spirit and water flows over the top. The same experiment may be made in substituting syrup, or a solution of gum, for the spirit, with the same effect; but in proportion as the fluid in the interior is capable of *wetting* the bladder, there will be an opposite current from within, outwards. Thus, when there is a solution of gum in the interior, and water outside, the water, which readily wets the bladder, passes in freely and mixes readily with the gum, the gum passes out but slowly, and thus the level of the inside fluid rises. The inward current is called *endosmose;* the outward, *exosmose:* and the force or rapidity of the current of *endosmose* is generally proportionate to the difference of density in the two fluids: thus, in the case of a solution of gum, the thicker it is, the greater will be the force of the current of water into the cavity containing it. *Endosmose* is undoubtedly the chief agent in the motion of the nutrient fluids of plants. The fluids within the roots are more dense than the water in the moist earth surrounding them; and the action of evaporation from the upper parts of plants is continually at work, during active vegetation, to *thicken* the fluids within the tissues; and thus a current of *endosmose* is maintained from cell to cell in those parts where no open passages exist

to produce capillary attraction. It is sufficient, at present, to indicate distinctly the existence of this peculiar force: a more detailed account of the mode of action in particular cases will be better understood, after we have studied the internal construction of the parts in which it operates.

ON THE CULTURE OF INDIAN AZALEAS.

By Mr. W. P. LEICH, Gardener to S. Rucker, Esq., Junior.

Nat. Order, Ericaceæ.

So much has already been written on the cultivation of Azaleas, that it may be supposed little remains to be said on the subject. I am convinced, however, that there is plenty of room for improvement in the culture of these delightful plants; and there is no more beautiful object for decorating the conservatory, in the spring months, than the Azalea, which, with good management, may be made to flower from January to the end of July.

The following mode of culture will, I trust, be acceptable to all who are about to commence the culture of the Azalea:—First, procure young plants, of the best varieties, which have been rooting freely, in sixty or forty-eight size pots. When they require shifting, pot them out in a compost prepared as follows, namely, of peat loam, and leaf mould. I take the proportion of three barrow-loads of peat to one of loam, and half a barrow-full of leaf mould, with about a peck of silver sand; let the whole be well knocked to pieces and run through a sieve with an inch and a-half mesh, and it is then ready for use. I should here mention, that I use the soil fresh from the common, digging it about two or three inches deep, and pulling out the grass and weeds.

In shifting from one pot to another, always keep the collar of the plant half an inch or thereabouts above the surrounding soil, that no water may lodge there, using plenty of drainage, especially for large plants, as this is the most important thing to be attended to. For those pots known as number eights or sixes, I use from two to three inches of drainage, being always careful to have them quite clean. I never reduce the old ball of earth otherwise than by rubbing off some of the surface soil, and disengaging the outer fibres a little; neither do I shake out all the crocks or drainage from the bottom of the plant, which could only be done by destroying the roots. After placing the drainage in the fresh pot, I place a layer of the coarse fibry soil that remains from the sifting of the compost over the crocks,—fill the pot to the required height, and placing the ball of the plant as near the centre of the pot as possible, fill the pot with the compost,—pressing it with the hand as I proceed. After filling to within two inches of the top, for large plants, and an inch for small ones, I give the plant sufficient water, in a tepid state, to settle the soil. I then place them in a house or pit with a gentle warmth, say from fifty to sixty degrees of heat, syringing them well both morning and evening, giving plenty of air, if the weather is favourable, early in the morning, and shutting up early in the afternoon. In this pit they may remain until the beginning or middle of August, when they should be hardened off gradually, so as to get the wood thoroughly ripened before winter. In this state they may be safely kept in a much lower temperature until February, when they should be looked over, shifting those which require it, and regulating the shoots, where requisite, by stopping the stronger ones, and training them into the required form. I introduce them again into heat, and pursue the same course of treatment in the second year. In the third or fourth season they will have made, if properly attended to, strong bushy plants, and will not require shifting so frequently. I have at the present time plants of the most choice varieties, four to five feet by two and a-half, covered with flower buds, that were only five or six inches high four years ago. The following, I find, will bear almost any amount of heat, and bloom well. There are some others that will not bear the least excitement in the way of forcing, but which start into a new growth, and hide the flower. Such I find to be the case with Perryana, Exquisita, Beauty of Reigate, &c.

The following varieties are found suitable for forcing:—

*Indica Lateritia.	*Indica Murrayana.	Indica Vivicans.
* „ Gladstanesii.	* „ Coronata (Smith).	„ Lateritia formosa (Ivery).
* „ Variegata.	„ Carminata (Pawley).	„ Apollo.
„ Rosea punctata (Knight).	* „ Phœnicea alba (Smith).	„ White (Fielder).
„ Minerva.	„ Optima.	„ Speciosissima.
„ Præstantissima.	„ Fulgens (Smith).	Sinensis.
* „ Broughtonii (Knight).	„ Duke of Devonshire (Pince).	

The plants marked thus (*), succeed best when grafted from six inches to a foot high; the others, being more robust growers, do well on their own roots.

Sacred Botany.—The Hyssop.

FEW of the plants mentioned in the sacred text have given rise to more conjectures, in modern attempts at their identification, than the Hyssop. About a score of different plants have been set down by different writers on this subject, all of which are set aside by the more recent researches of Dr. Royle, who appears to have shown satisfactorily that the Hyssop, or *esobh* (*esob* or *esof*), is the Capparis spinosa, or the Caper plant, represented in our woodcut. The supposed Hyssops of the Bible, just alluded to, include several labiate plants, as the modern Hyssop, the Rosemary, some Mints and Marjorams, the Lavender, common Thyme, &c.; a species of Phytolacca; some composite plants, as the Southernwood, and an allied species; ferns, as the Maidenhair, and the Wall-rue; and the common Hair-moss, or Polytrichum.

CAPPARIS SPINOSA.

The allusions to the Hyssop are widely dispersed through the sacred writings. The name occurs several times in connection with the ceremonial institutions of the Israelites, at the time of their Egyptian bondage and subsequent wanderings in the wilderness, (Exod. xii. 22; Levit. xiv. 4; Numb. xix. 6). King David also mentions it in his penitential psalm:—"Purge me with Hyssop, and I shall be clean; wash me, and I shall be whiter than snow" (Psalm, li. 7.) It is used in describing the wisdom of Solomon, who "spake of trees, from the Cedar tree that is in Lebanon, even unto the Hyssop that springeth out of the wall" (1 Kings, iv. 33). And it again occurs in connection with the crucifixion of our Saviour: "They filled a sponge with vinegar, and put it upon Hyssop" (John, xix. 29). An allusion to the Hyssop, in connection with ceremonial institutions, is quoted by St. Paul (Heb. ix. 19).

We shall, as far as our space will admit, follow Dr. Royle in his summary of the facts involved in the allusions of these texts, and then notice how far the Caper plant corresponds with the facts thus elicited.

At the institution of the Passover, Moses directed the elders of Israel to take a bunch of Hyssop, dip it in the blood of the paschal lamb, and strike the lintel and two side-posts of the doors of their houses with the blood (Exod. xii. 22). Therefore, the plant must have been indigenous in Lower Egypt, and sufficiently large and leafy for the act of sprinkling which is enjoined. In the ceremonial institutions which were appointed during the journeyings of the people between Egypt and Palestine, frequent mention is made of Hyssop in connection with acts of sprinkling and purification. Therefore, it must have been procurable on the outskirts of Palestine. David's allusion seems to apply to a detergent quality inherent in the plant; though this is sometimes explained symbolically, as referring to the ceremonial sprinkling with a bunch of Hyssop dipped in the "water of separation." But it is suggested, in reference to this ceremonial application of Hyssop, that it may have been selected originally from the fact of its being known to possess cleansing properties. The only certain fact, in connection with this subject, to be gathered from the description of Solomon's acquirements in natural history, is, that the Hyssop does sometimes grow from a wall or rocky surface; it is not necessarily the smallest of plants, as a contrast with the Cedar, as some have inferred. The use assigned to the Hyssop at the crucifixion shows it to be a native of Judea and of the immediate environs of Jerusalem. It seems also to have been used as a stick to which the sponge was fixed. These conditions are more fully met by the Capparis spinosa than by any other of the plants that have been suggested as the sacred Hyssop, as we must now briefly indicate.

1. *As to its geography.*—The Caper plant is found in Lower Egypt, and Forskal mentions it as growing wild "out of a wall" in the neighbourhood of Alexandria. It is also found generally on the islands and coasts of the Mediterranean. Dr. Falconer mentions, that the rocks at Aden are covered with the common, or a closely-related species of Caper plant. Dr. Clarke met with the Caper plant at Cyprus and in the Holy Land (Jaffa). Bové, entering Palestine from Egypt, found it at Gaza, and also in the desert of Sinai and among the ruins near Jerusalem. Belon and Rauwolf also found it in

the vicinity of the latter city. Thus, as growing on walls and rocky cliffs and precipices, and at least as indigenous to Egypt and Palestine, if not to the whole of the intermediate district in the which the Israelites wandered, the Caper plant meets all the requirements of the sacred texts.

2. *As to its properties and habit.*—The Caper plant possesses, or, at least, has always been held to possess, detergent properties. Pliny especially mentions its application as a medicament in the treatment of a skin disorder allied to leprosy, which, it is not a little remarkable, is the disease for the ceremonies of purification from which the sacred *esof* was directed to be employed by the Israelites. It was, probably, in allusion to its real or asserted influence upon diseases of this nature, that its ceremonial use was ordained.

The habit of the plant is to produce long trailing stems of sufficient length and substance to be used as a "reed," or stick, for the elevation of the sponge, as described in the events of the crucifixion. Such a stick the old Caper plants, growing in the congenial climate of Palestine, would be able to supply; and its prickly nature would, moreover, the better fit it for the purpose of having the sponge affixed. It is further suggested, that as different parts of the Caper plant were anciently preserved in vinegar, this may account for the presence of the vessel of vinegar in which the sponge was dipped:—"Now there was set a vessel full of vinegar, and they filled a sponge with vinegar, and put it upon hyssop," or, as some read, "fixed it upon a hyssop stalk;" for the Caper plant not only grew wild then, as now, on the rocks and walls of Jerusalem, but its flower-buds seem, from the earliest times, to have been much valued, and employed as a condiment. This same use—that of its unexpanded buds steeped in vinegar—is that by which the Caper plant is best known in our own times.

The Caper plant is supposed to be figuratively alluded to in the passage—"the Almond tree shall flourish, and *desire* shall fail?" (Eccles. xii., 5)—words explained to be written of the closing periods of man's life. On this, Dr. Royle remarks, "The Caper plant, like most of its tribe, is conspicuous for its long flower-stalks, which are erect when the plant is in flower and the fruit young, but which bend and hang down as the fruit ripens. As the flowering of the Almond has been supposed to refer to the whitening of the hair, so the drooping of the ripe fruit of a plant, which is conspicuous on the old walls of buildings, and of tombs, may be supposed to typify the hanging down the head, before 'man goeth to his long home,'" and "the mourners go about the streets."—M.

ON THE PROPAGATION OF CONIFERÆ.

By M. COURTIN, of Bordeaux.

DURING the last few years, Coniferæ have become somewhat popular among gardeners and amateurs, and it will, doubtless, be interesting to give a short description of the mode of propagating some of the more ornamental kinds, especially those which are often grown in pots or tubs, as ornamental objects for the conservatory or the terrace garden.

The modes of propagation here described, are those practised by an experienced gardener who has been for a long time exclusively occupied in the culture of this beautiful tribe of plants. It is well known among practical men, especially by propagators, that Coniferæ are not readily reared from cuttings, and that other means, such as the different processes of grafting, are much more successfully employed. It is not the less true that different species of Coniferæ require to be grafted by different methods. Many species cannot be propagated by cuttings at all, owing, no doubt, to their resinous nature. Those who cultivate Coniferæ, and desire to propagate them extensively, should keep at hand a number of the stocks best suited to the different species. The following sorts are recommended for this purpose:—Araucaria imbricata; the different species of Pinus; Thuja orientalis, and occidentalis; Juniperus virginiana; Podocarpus elongatus; Taxus; Cupressus; Taxodium distichum; and Dacrydium spicatum, or Podocarpus spicatus.

What is called side-grafting, is the mode most successfully adopted with many kinds that are required to be quickly grown into strong and vigorous plants. The best time for performing the operation, is in the months of March and August. The stocks used ought not to be stronger than a common quill. Worsted or woollen thread is found to be the best tying material that can be used. As soon as the plants are grafted, they must be placed near the glass of a propagating house, in an inclined position, so as to impede the circulation of the sap to the top of the stock, and to facilitate the adhesion of the graft. The management must be the same as that given to grafted plants in general; but care should be taken not to allow them to become too moist. They must also be frequently cleaned, and the stock must not be cut down before the graft has grown somewhat strong and vigorous.

The best time for taking cuttings is towards the latter part of the summer, and it is necessary to

select them from the young shoots that have grown the same year: they should be cut close to the old wood. The cuttings should be planted in pots of silver sand, and kept in a warm greenhouse or propagating house, and covered with a bell glass or a hand light. Those persons who have not the convenience of a house in which to place cuttings, may avail themselves of the mode of propagating called layering. For this purpose, when the young shoots have become sufficiently strong, it will be necessary to erect an artificial stage around the plant which it is desired to propagate. On this stage, pots of suitable soil must be fastened, by being tied to the boards, and in the position best adapted for the operation. The branches must then be gently bent over the pot, and properly secured in their place; the young shoots inserted in the soil of the pot, and secured with a small peg. This is the most successful mode of propagating such kinds as Pinus longifolius, P. palustris, and P. Hartwegii, which have a spongy bark.

Grafting upon *roots* has been found very successful with the different species of Thuja and Juniperus. This mode is performed as follows:—In February or March, the small roots of Juniperus virginiana, and Thuja orientalis or occidentalis, are taken off: they must not be stronger than the scion or shoot, which should be selected from last year's wood, near the summit of the plant. When the grafts are made, the roots must be potted in small pots and placed on a shelf in the greenhouse, being kept close, and shaded until established.

As regards the most suitable stocks for Coniferæ, it may be observed that they are most successfully raised from seed. It is not advisable to take young plants from a collection for this purpose; because they do not accommodate themselves to pot culture so well as plants obtained from seeds. Good healthy seeds of the species named at the beginning of this article, should be procured for the purpose of raising plants to be kept as stocks. Such plants will be found most suitable for those engaged in the propagation of Coniferæ. The seeds should be sown in February, in wooden boxes of convenient size, and three or four inches in depth. The soil most suitable for sowing them in is sandy peat, mixed with a fourth part of loam. The boxes should be well drained, and, after the seeds are sown, placed in a temperate greenhouse. As soon as the seedlings appear, the boxes must be removed near the glass, in order to give the plants plenty of light. Before the first leaves appear, the young plants should be taken out and potted in two-inch pots, using a sandy peat soil, but no loam. This treatment is preferable to allowing the young plants to grow large in the box, and then shifting them into pots; as, when they are taken out of the box very young, with only one or two roots, they are less liable to be injured, and they soon adapt themselves to their new situation. When the seedlings have been potted, they should be removed to a cool frame, and placed on a bed of ashes or gravel, but quite near the glass. They will require to be shaded during bright sunny weather, and care must be taken never to allow them to become either too dry or too wet. The frame may be kept rather close till the end of May, or the beginning of June, according to the state of the weather, when the lights may be taken off. As soon as very rainy and frosty weather sets in, the lights must be put on again, to remain on all the winter. Very little shelter will be necessary except during severe frosts. Air must be admitted to the plants on all favourable occasions. In spring, they will require to be shifted into four-inch pots, and if properly attended to, they will be ready to graft upon by the autumn.

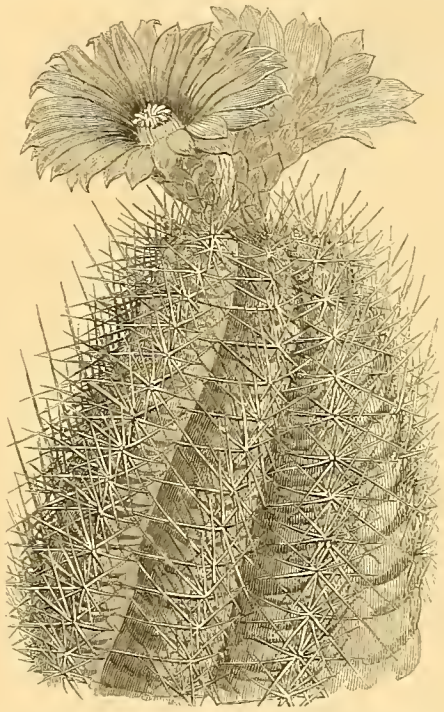
Seeds of Taxus, Thuja, and Juniperus virginiana, may be sown in the open ground, and pricked into pots three or four months before they are wanted to work on. They may be removed to a shelf in a temperate moist stove, to remain for some time, the better to establish them in the pots.

Miscellaneous Notices.

Trapa bicornis, or Ling.—Leaving the [city of Keahing-foo] behind us, and sailing westerly, we entered on a broad sheet of water of considerable extent, which probably is part of, or at least joins, the celebrated Tai-ho Lake. This part of the lake is very shallow, and a great part of it is quite covered with the *Trapa bicornis*, a plant called *ling* by the Chinese. It produces a fruit of a very peculiar shape, resembling the head and horns of a bullock more than anything else, and is highly esteemed as a vegetable by the Chinese in all parts of the empire. I have seen three very distinct species or varieties of this plant, one of which has fruit of a beautiful red colour. Women and boys were sailing about on all parts of the lake in tubs of the same size and form as our common washing tub, gathering the fruit of the *ling*. I do not know of any contrivance, rude as it appeared, that would have answered the purpose better than these tubs; for they held the fruit as it was gathered as well as the gatherers, and, at the same time, were easily propelled through the masses of the *ling* without doing the slightest injury to the plants. Nevertheless, the sight of a number of people swimming about on the lake, each in his washing tub, had, in my eyes, something very amusing and ludicrous about it.—*R. F., in Athenæum.*

NEW AND RARE PLANTS.

Echinocactus rhodophthalmus, *Hooker.*—Red-eyed Echinocactus (*Bot. Mag.*, *t.* 4486).—Nat. Ord., Cactaceæ § Cacteæ.—A greenhouse succulent plant of sub-columnar form, six inches (or more) high, longitudinally divided into eight or nine deep furrows, with obtuse ridges, formed by transverse lines into lobes or tubercles, each tubercle bearing a cluster of about nine strong, straight, spreading spines, about an inch in

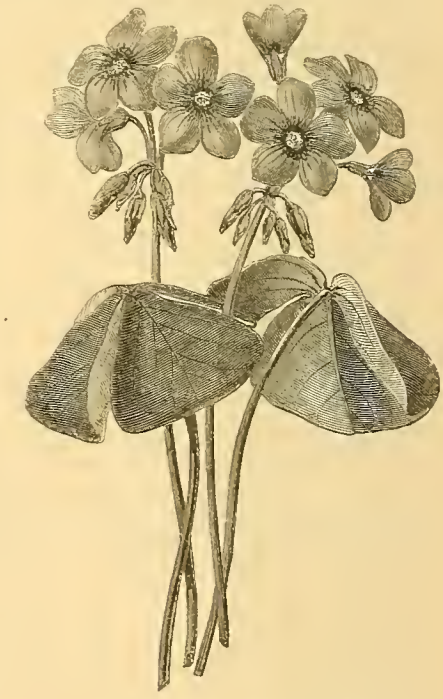


length, the central one longest, and standing forward. The flowers—from the top of the plant—are large, handsome, the petals linear-spathulate, rose-coloured, a dark red stain at the base forming a radiating circle around the staminal column.—From Mexico: San Luis Potosi; introduced about 1847, by F. Staines, Esq. Flowers in summer. Royal Botanic Gardens, Kew.

Berberis nepalensis, *Sprengel.* Nepal ash-leaved Berberry, (*Journ. Hort. Soc.*, v. 18).—Nat. Ord., Berberaceæ, § Berberideæ.—Syn., B. pinnata, *Roxburgh;* Mahonia nepalensis, *De Candolle.*—A fine evergreen shrub, apparently hardy; but this has scarcely been tested. The leaves are pinnated, a foot or more long, with five or six pairs of sessile ovate-oblong, obliquely cordate leaflets, the largest three inches long, and all coarsely spiny-toothed. The flowers are large, and grow in erect simple racemes, sometimes as much as six inches long. Unprotected, young plants have borne 14 deg. of frost without suffering in appearance.—From Northern India: mountains; introduced in 1847, by the Hon. East India Company. Horticultural Society.

Odontoglossum rubescens, *Lindley.* Blushing Odontoglossum. (*Journ. Hort. Soc.*, v., 35).—Nat. Ord., Orchidaceæ, § Vandeæ-Brassidæ.—A fine stove epiphyte, with oblong, compressed pseudo-bulbs, bearing a single leaf, and racemes of from two to six flowers, the sepals of which are linear-lanceolate, richly spotted with crimson, the petals oblong, wavy, having similar spots near their base, and the lip spotless, crisped, and cordate, but not ciliated. It is remarkable from the flowers being suffused with a tender blush colour.—From Nicaragua; introduced by G. U. Skinner, Esq., in 1848. Flowers in autumn. J. Bateman, Esq.

Oxalis elegans, *Humboldt, Bonpland,* and *Kunth.* Elegant Wood-sorrel, (*Bot. Mag.*, t. 4490.)—Nat. Ord., Oxalidaceæ.—A very showy, half-hardy, tuberous-rooted perennial, with trifoliolate leaves, the leaflets of which are deltoid, or sub-rhomboid, and glabrous. There are two varieties, in one of which the underside of the leaves is of a purple tint, in the other green; the latter has the flowers somewhat smaller, but brighter coloured than those of the other variety. The flower scapes grow



nine inches or a foot high, bearing an umbel of from six to ten flowers, of five broad, oval clawed spreading petals, rose purple, with a very dark purple eye; in the smaller variety the blossoms are upwards of an inch across. These are likely to become valuable plants for the flower garden.—Both varieties are from Columbia: Andes of Loxa, at an elevation of nearly 7000 feet; introduced, in 1848, by Mr. W. Lobb. Flowers throughout summer and autumn. Messrs. Veitch and Son, of Exeter.

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Philodendron Selloum.

PHILODENDRON SIMSII.

Nat. Order, Araceæ, ♀ Caladieæ.

Generic Character.—Philodendron, *Schott.*—*Spathe* convolute at the base, straight, closed after flowering. *Spadix* continuously androgynous; *rudimentary reproductive organs* below the stamens; no sterile appendix. *Anthers* two-celled, distinct, 2-7 placed back to back in arcolæ; the cells hidden within the connective, open at the apex. *Ovaries* many, crowded, free, 5-15 celled. *Ovules* several, ascending from the central angle of the cells, orthotropous; *style* very short or wanting; *stigma* capitate, truncate, or with imperfect radiating lobes. *Berries* distinct, many-seeded. (*Endl. Gen. Plant.*)

P. Simsii.—*Kunth.*—Caulescent; rooting; leaves shining cordate-sagittate, acute; petioles roundish, slightly flattened on the upper side; spadix slightly contracted below the middle, then tapering gradually to a point; spathe cylindrically hood-shaped above, constricted in the middle, inflated below, a little longer than the spadix.

Synonymy.—Philodendron Simsii, *Kunth. Enumeratio Plant.* iii. 48.—Caladium grandifolium, *Sims, in Bot. Mag.* t. 2643 (*not of Jacquin*). C. Simsii, *Hooker, in Bot. Mag.* p. 3345.

DESCRIPTION.—A fine stove perennial. Rhizome elongated into a stem, rooting. Leaves cordate-sagittate, very large, the blade two feet long, shining; petiole roundish, more and more flattened on the upper side upwards, elongated (thirty inches), closely marked with fine, deep-green, interrupted streaks: petiolar sheath very short. Spadix about eight inches long, cylindrically hood-shaped, convolute at the base, contracted in the middle, and attenuated above into a fine point, white, and marked about two inches below the contracted portion with an oblique crimson band, shaded off above and below. Spadix nearly as long as the spathe, thickened below, slightly contracted below the middle, and taping gradually up to the rather acute point; the first inch from the base occupied by the numerous distinct ovaries, the remainder presenting a smooth surface, with reticular lines indicating the boundaries of the groups of sterile and fertile stamens. Rudimentary staminal groups below the fertile.

Stamens consisting of distinct sessile, two-celled anthers, arranged 2-7 in a polygonal group, back to back, in close contact, the cells of the anthers concealed within the connective, opening at the apex. Ovaries numerous, crowded, but free, conical, many-celled; styles almost none; stigmas capitate, flattened on the summit, and with slightly marked radiating lobes. Ovules numerous, orthotropous, ascending from the internal angle of the cells. Berries?

History.—This plant is a native of Demerara, and is not new to our gardens. It was figured by Sims in the *Botanical Magazine*, under the name of *Caladium grandifolium;* Sir W. J. Hooker subsequently showed, in the same work, that it was not the *Arum grandifolium* of Jacquin, and named it *C. Simsii.* It belongs to the genus *Philodendron* of Schott, under which name it is included in Kunth's "*Enumeratio.*" Its large, glossy, deep-green leaves, and broad crimson band in the white spathe, give it a striking appearance.—A. H.

Culture.—The Philodendron figured in our plate is a free growing stove plant. It should be potted in rough, porous compost; and, from its large size, requires a large pot, which must be well drained. The old stems push out roots, which hang about the pot without striking into the soil, and, no doubt, contribute, like the aërial roots of orchids, to the support of the plant. It is increased by separating the shoots which, from time to time, branch out from the old stem. The species is more curious than ornamental.

ON SOME POINTS OF EXCELLENCE IN FLORISTS' FLOWERS.

By Mr. GEORGE GLENNY, F.H.S.

AS there is nothing more essential to the improvement of flowers than a knowledge of what would constitute perfection, it may be acceptable if we give a slight sketch of the principal features desirable in some of the more popular of our ornamental plants and florists' flowers, that those who raise from seed may be aware of the points most esteemed, when they select for future cultivation; and, besides this, offer a few remarks on the general principles which have been observed in deciding upon the proper forms, because the same principles would govern in the estimate of flowers not yet treated of.

Plants are distinguished from weeds, not by any law of vegetation, because they are all wild, or rather indigenous, somewhere, but they are appreciated for certain properties which are deficient in those treated as weeds. It is not colour, for some of our worst weeds are splendid—witness the scarlet Poppy, the bright yellow Charlock, the Buttercup, and many others; but it is a combination of good qualities, or some one good quality, in particular. The claims which seem, more or less, to predominate are:—

Perfume.—Desirable in everything, whether gay or otherwise; witness the Violet, Mignonette, Pink, Stock, Carnation, Wall-flower, Sweet Pea, Heliotrope, &c., in flowers; and the Rose, Thorn, Sweet Brier, Honeysuckle, Magnolia, Clematis, &c., among shrubs.

Continuous blooming, even without perfume, as in the Scarlet Geranium, Verbena, China Rose, Dahlia, Convolvulus, Heliotrope, Calceolaria, &c.

Elegance of habit in the plant, as in the Fuchsia, and in most evergreens, especially the Holly, Box, Laurel, and nearly all the Coniferæ.

Splendour of the flower, as in the Camellia, Pelargonium, Erica, Azalea, Rhododendron, Ranunculus, Anemone, &c.

All these points are desirable, and although some subjects may possess only one of these in an eminent degree, there are others which possess more than one, though perhaps not so decidedly as some others may possess the individual properties. Looking on the opposite side of the question, the wild plants that have not been adopted have peculiar faults that account for their rejection as garden flowers. They are:—

Flowers with very thin petals, that perish or fall almost as soon as they are open, however brilliant, as the Field Poppy or the Sun Rose.

Plants with a very small portion of flower to a large proportion of foliage, such as Balm, Bryony, Fig-wort, Touch-me-not, the Mallows, and many others.

Plants which root and occupy the ground, to the exclusion of everything near them, such as the Bind-weed and field Convolvulus.

Plants too insignificant to be noticed at all as objects of ornament, having no flowers worth looking at—the Nettles and Docks, for instance.

But there are other wild-flowers that have been improved, or rather there have been valuable garden flowers raised from them. The wild Pansy, for example, is a most insignificant weed, but has given rise to one of the most esteemed races of florists' flowers; and many others have been cultivated with great care and success. Still, we are not without garden flowers that are also wild, but in which little or no progress has been made towards improvement. The Digitalis or Fox-glove may be seen wild and domesticated at the same time, and without much difference in its qualities. It must be confessed, too, that hundreds of flowers have been introduced, only to be discarded as soon as they have been cultivated, because they do not possess the qualities that we value in garden flowers; they have either had too little bloom for the quantity of foliage, or the flower has been too short-lived, or narrow-petalled, ill-formed, or in some way or other not attractive. Plants, and especially annuals, should have a large proportion of flower; the foliage should not intrude, or rather obtrude; they should be compact, elegant in form, and continue a long time in flower, or they lose by comparison with the best of those we already possess.

As regards individual properties and qualities, perhaps no flower has caused more discussion than the Tulip. The form alone has occupied the attention of many who have endeavoured to upset those rules which we laid down in 1832, but which stand to this day as the only standard, in despite of all that has been written to the contrary, from that time to the present day. Some object to our rules because they are against nature, and argue, on the point of the edges being level, that if the tops of the petals be square, the marking cannot be natural. To which we reply, that our model forms are suggested by a knowledge of what would be the most perfect form for any flower to please the popular taste, and to become a lasting favourite; and whether they are natural or otherwise, is a matter of little moment. Those who look at both sides of the question would know, that the top of a cup-formed flower might be level, and yet the ends of the petals which form it may be circular, in the same way that a flower with radiating petals can be perfectly circular, though their ends may not be entirely obtuse. The Cineraria has become nearly a perfect circle, by means of the petals overlapping each other. The Pansy has become so nearly round, by the same means, that it is the language of inexperience which dictates the form of individual petals; the form of the whole flower is the first consideration, the petals are secondary, although they must be thick and firm. The writers on the form of the Tulip have not dealt fairly by the matter; and, with long-drawn arguments about the impropriety of particular forms, they have endeavoured to show, that because it is difficult to attain our standard, we must be wrong; but this does not alter the case. We say that a certain form would be perfection. It is not a question with us whether the form can be attained. The only question to settle is, whether it would or would not be the most beautiful, if it could be attained; and this being admitted by common consent, those varieties which *approach nearest* to the standard must be the best flowers. We know that the Tulip cannot very easily be bred to a plain flat edge along the top of the petals, but we know, at the same time, that those which are nearest to a level edge are the best in that respect.

The Pansy and Cineraria are nearly round; the Verbena is rapidly widening its petals, and becoming more circular; and every flower we have touched upon has made an approach that augurs still more favourably of ultimate results. The Hollyhock is comparatively a new introduction among florists' flowers; no flower has made a more rapid progress in the right line; the worst of all its faults has disappeared from some of the new varieties; thick petals have assumed the place of the thin flimsy ones that always rendered the flower valueless, or nearly so, and, instead of the Poppy-like blooms, which were destroyed by a day's sun, we have bold and lasting flowers, full, double, and all but symmetrical. Those varieties that have these qualities, have been admired by hundreds, perhaps thousands, who do not know why they admire them; but we can tell them, it is because they approach to the standard of perfection.

Let us look to the new varieties of roses: if we quote Mr. Rivers as an authority, we can show, that of a hundred imported varieties, not more than a dozen, or thereabouts, are worthy of being sent out; and why?—Because those which approach the standard, are selected by the public, while those which do not, are universally rejected. The roses that would have been sent out with impunity a few years ago, are rejected by the dealers themselves, when they try them before selling. It is the improvement of the taste of the multitude that does the service. The information that is spread abroad and spreading, as to the real qualities that raise the value of a flower, closes the market against bad ones; and, in proportion as the old ones are beaten and thrown by, so does the value of good varieties become enhanced.

The respective opinions of the northern and southern pink growers have almost become amalgamated; there is, indeed, a point raised by some few, which is only worth noticing because it has been raised

and not because of any impression it has made. It has been contended that the lacing of a Pink ought to be on the edge of the petal, because a Piccotee is so. We assert, that the perfection of lacing in the pink is to have a white edging outside of it. There is no comparison in the brilliance of the one and the other; there is nothing in common between the Piecotee and Pink to require or suggest that the lacing of the one should be like the edging of the other. The Pink is the more perfect according to the equality and smoothness of the lacing or band, whereas the Piccotee is perfect with a complete feather inwards, and the depth or shallowness of the feathering forms no part of the value, if it be perfect all round; but it must be free from any break, for a bit of white on the edge of a Piccotee—that is, a speck not covered with the colour of the feathering—is a distinct and special blemish. Let any indifferent person place a pink with a white edging all round on the outside of an even band or lacing, by the side of one of which the colour reaches the edge, and the first glance will decide what we say.

There is another point very obstinately contended for by some, who go to the letter of the law, as they call it, instead of acting on the spirit of it. In Dahlias, a cupped petal will beat a reflexed one, but a reflexed petal only tells a point against a flower. The variety which brings this argument to mind is the Princess Radzivill, which we contend, though having reflexed petals, is the best of all the flowers of its class. It has all the points but one; it is a perfect two-thirds of a ball, round in the outline, symmetrical in the disposition of the petals, perfect in the eye, and quite double, but the petals reflex. We have no other Dahlia so perfect, in all but the reflexing petals; and merely one fault, or rather the absence of one beauty—the cupped petals—cannot make it even a questionable flower. In short, if there were flowers of all the colours we have as perfect as the Princess Radzivill, no stand could be placed in competition with them, and have the slightest hope of success.

ON THE PROPAGATION OF CONIFERÆ.

By M. COURTIN, of Bordeaux.

The following are the principal kinds of Coniferæ requiring particular modes of propagation:—

Abies. See *Pinus.*

Araucaria. The propagation of this genus varies considerably as regards the ease with which cuttings are struck. The species which strikes most readily is A. Cunninghamii. To obtain young plants of this, select the cuttings in February or March from half-ripe side shoots about three inches long; the terminal shoots of side branches may also be used. Let them lie till they are somewhat dry, and having carefully cleaned the cut end, pot them in six-inch pots of clean moist sand, and keep them covered with a hand light in a greenhouse. When they have grown a few inches, bend the plants gently down towards the surface of the soil, and secure them in this position by small pegs; this will induce them to break out at the base; when the shoots which have thus pushed out have grown to a few inches, and have become somewhat strong, it will be necessary to cut off the branch which was bent down, which may be used again as a cutting. This mode of treatment is applicable to all Coniferæ. A. Cunninghamii may also be propagated by roots; and if there be any old shabby plant, it is as well to sacrifice it for the sake of obtaining a stock of nice young healthy plants. Cut the roots in pieces of four or five inches in length, and choose those that are the thickness of a common quill; pot them in pots filled with sandy peat, keeping the cut level with the surface of the soil; treat them afterwards like cuttings of ordinary plants, but do not cover them with anything. As seeds of Araucarias are easily obtained, only the better or more choice sorts should be grafted on seedlings about a year old, which will produce good strong plants in the shortest time, at least sooner than from cuttings, especially if they are grafted as near the roots of the stock as possible. The best mode of grafting Araucarias is side-grafting; but the graft must be placed near the roots, and the operation performed in July or August. It is advisable to select only fine young terminal shoots. In nurseries, one good old strong plant should be kept for the purpose of producing cuttings. This may be attained by cutting down the heads of such plants as are less serviceable for any other purpose. This will induce them to send out numerous young shoots near the cut, and on the stem.

Callitris (Fresnelia.) This is propagated by cuttings in August, but not very readily, as they do not strike freely. C. quadrivalvis may be grafted on stocks of the common Thujas, in the ordinary way, in the months of August and September.

Cedrus. See *Pinus.*

Cephalotaxus. This very closely resembles the Taxus in habit, and may be readily worked on it. The large-leaved species are best propagated by cuttings.

Cryptomeria japonica. This may be propagated pretty freely, by cuttings, in August and Septem-

ber; but, it is much better to work it on Taxodium distichum: this must be done as soon as the young shoots begin to ripen, which will be about July. The young plants will thus have time to grow before the winter sets in.

Cunninghamia sinensis, (Belis jaculifolia), is propagated, very freely, by cuttings planted in pots of light sandy soil, in spring and autumn.

Cupressus. These are best raised from seeds, as seedlings are found to make the finest plants. C. sempervirens, in particular, is not so successfully propagated by any other mode; cuttings grow very slowly. August and September are the most suitable months for grafting the better sorts on seedlings of C. sempervirens.

Dacrydium. These are propagated, most readily, by cuttings taken in August and September. D. Franklinii, (Huon Pine), grows very freely, by cuttings. D. Bidwillii is most successfully propagated, by being grafted in August, on Podocarpus spicatus.

Dammara. All the species of this genus are somewhat difficult to propagate by cuttings; they are therefore, best grafted on Araucaria imbricata or A. braziliensis. It sometimes happens that a tenacious substance gathers on the incision made on the stock; and, it may be well to observe here, that such substance is not detrimental to the development of the graft, and it may therefore be allowed to remain.

Exocarpus. This is readily propagated from cuttings taken in August and September.

Juniperus. These are readily propagated from cuttings taken in August and September. The rarer kinds may also be successfully grafted on J. virginiana, at the same season.

Larix. See *Pinus.*

Libocedrus, is very near to Thuja, and may be similarly managed.

Picea. See *Pinus.*

Pinus. This is a very rich tribe, and includes the following section:—Pinus, Picea, Abies, Larix, and Cedrus. Propagation, by cuttings, is very difficult, and they are much more readily raised by grafting on those to which they are allied. They are also freely propagated by seed. Abies, Picea, and Cedrus, however, can be propagated by cuttings more readily than by any other means. The best time for taking cuttings, and performing the operation of grafting, is in February and March, or September and October. The stock and graft should be of equal size, as they then join much better, and sooner than when unequal. Only such pines as are quite hardy should be selected for grafting on, and the strongest stocks should always be used. Pinus Strobus, and P. sylvestris, grow very well in the open ground; but P. Mughus is the best adapted for exposure in places where the climate is cold. Cedrus grows freely from cuttings, and is also readily grafted on the hardy species of Pinus, Larix sibirica, L. americana, and others, can only be propagated well and readily, when grafted on L. europea, and its varieties. Picea and Abies may be readily worked on stocks of each other, but the best stocks to graft upon, are Abies excelsa, and P. pectinata.

Podocarpus. This is readily propagated by cuttings made any time between September and April. Cuttings of P. spicatus (Mai), should not be taken before October as the young shoots are scarcely ripe before that time; those of P. elatus should be fenced separately, in small pots, and the young plants should be well established before being shifted. New sorts, which are not so easily struck, may be grafted on P. elongatus.

Phyllocladus. This is readily raised from cuttings, taken in August and September, or in February and March. The shoots of last Summer's growth only should be selected; cuttings from branches two years old may require to stand more than a year before they strike.

Torreya taxifolia. This is a very fine species, and is readily propagated from cuttings, between September and March.

Taxodium distichum, (Cupressus distichum.) The best mode of propagating these is by seeds; and those obtained from the countries of which it is a native, are to be preferred. The plants obtained from seeds make the best of all stocks to work the following kinds on:—Taxodium pendula, T. Muciferum, T, distichum, T. sempervirens, and Cryptomeria japonica. These may all be grafted in July. If there is no opportunity of obtaining seeds, it will be advisable to select cuttings of the young shoots of an old plant of T. distichum, which has been cut down as already directed under Araucaria.

Taxus. All the species and varieties of this genus may be propagated freely by cuttings made in autumn and spring; they may also be grafted on Taxus baccata, at any season, excepting when it is making its growth. The best time for the operation is August.

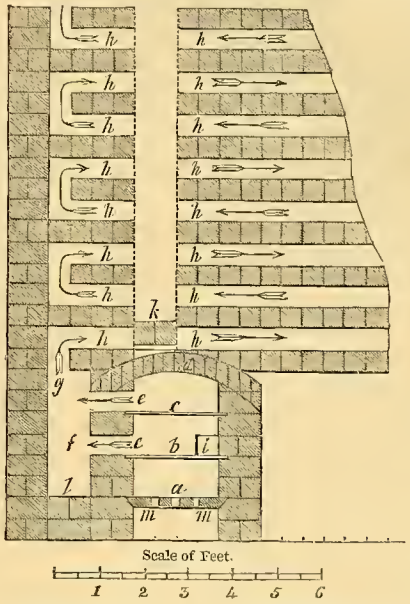
Thuja. All the species of this genus may be readily propagated by cuttings, with the exception of T. pendula, the habit of which does not so well admit of this mode of propagation. It is most readily worked on Thuja orientalis or occidentalis.

Widdringtonia. This is easily propagated by cuttings taken from August till November.

THE CONSTRUCTION AND HEATING OF GARDEN WALLS.

By Mr. P. WALKER, Gardener to H. Skrine, Esq.

NO horticultural erection is so generally met with as garden walls, and nothing so frequently shows the want of proper care. Walls may be built either of brick or stone, as is most convenient in the locality. Bricks are generally preferred, but their superiority in radiating heat is not so great as to be worth incurring extra expense, for stones make a wall fit for all purposes required, if care be taken by the masons to make proper joints, and they are not permitted to fill up with large seams of mortar, which fall out the first winter, leaving crevices capacious enough to shelter an army of insects, sufficient to eat all the fruit. The objects of a garden wall are specifically twofold: first, protection from radiation during the absence of the sun, by which excessive cold is avoided. Dr. Wells's experiment on dew illustrates this. A thermometer, protected by a handkerchief held horizontally, was found, by repeated experiments, to be from 4 to 6 degrees higher than one openly exposed on a grass plot. This is the conservative power of the garden wall, and it is one of great importance; for the greatest radiation takes place during calm, clear nights, and may be so much in excess as to produce frost ten months in the year in our climate. The second object of the garden wall is accelerating vegetation, by increasing the temperature of the atmosphere in which the tree grows. When the wall is heated by the rays of the sun, it, in common with all heated bodies, radiates its caloric in ratio to the square of its distance: thus, if at one foot from the wall we have a power of 1 degree, at one inch we have a power of 144 degrees. The reflection of all the unabsorbed rays of the sun, impinging on the surface of the wall, increases the temperature of the atmosphere considerably. This power I will term forcing. That it may be as efficient as circumstances will admit of, the coping must only project two inches over the top of the wall, that it may not prevent the rays of the sun falling on the trees, but at the same time be sufficient to protect them from rectilinear radiation by night.



SECTION OF A HOT AIR STOVE-CHAMBER, AND FLUES FOR HEATING A GARDEN WALL.

a, Furnace.
b, First iron plate on which the fire acts.
c, Second iron plate.
d, Brick arch.
e, Air holes, opening into the hot air chamber.
f, Hot air chamber.
g, Flue, communicating between hot air chamber and flues *h*, *h*, &c.
h, Flues in the interior of the wall.
i, Door to slide open when it is desirable to accelerate the circulation of the air.
k, Soot door and damper.
l, Door for removing dust from the bottom of the hot air chamber.

The heating apparatus, being placed below the ground level of the wall to be heated, is, as much as is practicable, situated at the lowest point of the ground level of the wall. The furnace is bricked, (*m*, *m*.) that a supply of the coal may be coked, thereby reducing the consumption of fuel, and lessening the attendance requisite. The air in contact with the plates *b*, *c*, being expanded by heat, will flow into the chamber *f*, coming into contact with colder air there, it will acquire a rotatory motion, retaining a tendency to ascend in ratio to its rarefaction, and, in consonance with which tendency, it will flow along the flues *h*, as indicated by the arrows. When the heated air is found to circulate sluggishly, in consequence of its peculiar electric condition, sliding open the door *i*, will accelerate its circulation.

The conservative power is often aided by canvas, nets, straw, or spruce fir branches. Of these, canvas spread by night, and removed by day, is the best, for increasing the forcing power, which is imperatively necessary for Peaches and Nectarines, in cold, cloudy seasons, when they make late growth, are badly ripened, that is, they are unproductive next year, which often ends in the total destruction of the tree by canker. If the wall is flued, and fire heat is introduced by smoke, these flues are unfortunately found in practice too difficult to clean, and consequently draw badly when damp or foul, from their great length and necessarily tortuous course. Hot water pipes have been used with better effect; but the expense in procuring and fixing them, has prevented their use in a general way.

The method of heating that I recommend, with hot air, is one which may be effected at no more expense than flues; and—however doubtful may be the propriety of introducing air, deterioted by passing over a highly heated surface, for the supply of animal and vegetable organization, in this case,—it can be productive of no evil, being merely introduced into the interior of the wall. In height, the wall should not be under eight feet, from

the ground level to the coping; but ten feet will be found the most useful height for general purposes. Where the area of the garden is flat, the appearance is much improved by raising the wall, on the north side, a foot or two higher, carrying the rise round the north-east and north-west angles, and finishing with a cavatto or turret, in character with the architecture of the place. Not that I would recommend too much architectural display, to which fitness and propriety are frequently sacrificed by architects and builders; but the style of architecture adopted in the mansion, ought to pervade its appendages, or a bizarre and mean appearance will be the result. Thus, on the simplest plan, the garden doors should be supported by a couple of pilasters or pillars engaged. But where Gothic architecture is adopted, a buttress may be made to support each angle, adding both to the beauty and utility of the wall.

A coping is essential to the preservation of the wall from the effects of weather, at the same time, it much improves its appearance. One of the most simple and efficient that I have seen, is used by Mr. Walker, Preskilly Gardens, Pembrokeshire, this is made of slate flags, a couple of inches thick, bevelled off to three-quarters of an inch at the edges, and projecting two inches on each side. These projections, as before stated, greatly enhance the conservative power of the wall. Training is generally effected by nailing with shreds, but is attended with this evil,—the wall, after a few years, becomes so full of holes, that destructive insects, such as earwigs, and wood-lice, find ample shelter therein. It has, therefore, been attempted to remedy the evil by fitting wires along the face of the wall, on which the trees are trained. Unfortunately, in this case, a space intervenes betwixt the trees and the wall, where the heated air escapes at the small angle of divergence, in consequence of the greater lightness, caused by the rarefication of the air, while the constant flowing in of the denser and colder air to supply the place of that escaped, produces a current which completely destroys the forcing power of the wall. I therefore come to the conclusion, that the only eligible mode of training trees, on an open wall, is by nails and shreds. For the purpose of destroying the larvæ of insects, I mix quicklime, as for whitewash, adding an equal quantity of soot, so as to make a thick wash. With this I wash over the walls and trees every winter, at the time when I unnail and train them. This, with attention to pointing the walls with good cement, when they require it, will keep them in good order.

ON THE ADVANTAGES OF PROTECTING THE STEMS OF APRICOTS.

By Mr. HENRY BAILEY, C.M.H.S., Gardener to G. Harcourt, Esq., Nuneham.

THE Apricot is a fruit which is generally held in high estimation, and it is certainly well worth a little extra trouble and attention to secure a crop. But under the best management, how often do we see the finest trees dying away—first a branch, next a whole side, and so on—till scarcely a vestige of the tree is left. Philosophers and Gardeners have been equally at a loss to account for this seemingly sudden paralysis, which generally occurs on fine warm, sunny days in Spring and early Summer. The Moorpark variety is more particularly subject to this affection, and this is the more grievous as it is our most excellent variety.

I believe that the mischief is occasioned by frost. Apricots upon south walls are soon excited by a few sunny days in spring, when the sap-vessels become filled with watery sap. If in this state a severe frost occurs, the sap-vessels are burst by the freezing fluid, and consequently the whole economy of the plant is deranged. Some parts of the tree are injured more than others—such limbs, having consumed the sap which was inherent in them, can draw no further supply—and on the first day when the solar influence is sufficient to cause excessive perspiration, they languish and die. The evidence of this injury is not always manifest in the first year of its occurrence; but, in a ratio proportionate to its amount, may extend to two or even more years.

To obviate this mischief, some kind of protection seems necessary. I use nets made of sedge, with about four-inch meshes, taking care to envelope the bases of the main branches with the same material. My experience with this material has now extended over three years, and my trees are much less injured than formerly.

I also find these nets a better protection for the blossoms than woollen netting or canvas, as they admit more air. I believe that all coverings which are fixed, do harm by preventing the circulation of air when the sun is powerful.

But whatever covering is adopted, it seems to me to be inadequate, unless united with a flued wall. (I speak now of preserving the blossom in such severe Spring frosts as that of April, 1849.) A greater amount of heat must be radiated from the wall than is supplied by natural agencies, and its escape into space must be prevented by a thick covering, if we would keep out ten or twelve degrees of frost.

Miscellaneous Notices.

Samphire, or Sampire—(A corruption of Saint Pierro, to whom this plant was dedicated, perhaps from its growing so much upon rocks)—forms a yearly article of exportation from this island, (Isle of Wight), for pickling. The plant is collected at great personal risk, by people called cliffsmen, who used to pay an annual tribute (now remitted) to the lord of the manor of Freshwater, for the privilege of taking both this and the eggs of sea-fowl, that breed in vast numbers in the stupendous chalk cliffs, which rise, like impregnable ramparts, to 600 feet, at the extreme south-west corner of the Isle of Wight. The eggs (of various species of gull) find a ready market in the metropolis, at 2*s.* 6*d.* a dozen, and are considered a delicacy, though I am unable to ascertain to what class of persons the consumers belong. The samphire is consigned by the cliffsmen, packed in casks, with salt water, to certain wholesale houses in London, by whom they are paid 4*s.* per bushel, cleaned and sorted. For smaller quantities, as when required for private consumption, the charge for collecting is one shilling a gallon. The samphire is considered in perfection when just about to flower, or towards the end of May, and the gathering lasts for several weeks, as the plants come successively into blossom. The herb minced is served up with melted butter, instead of caper sauce, in this island.—*Dr. Bromefield, in Phytologist.*

Chinese Rice-paper, or Bok-shung.—The substance commonly called Rice-paper by the Chinese, is made from the pith of a plant or tree, which grows principally in the swampy grounds in the province of Samswi, in the northern part of the island of Formosa, where it is said to form large forests. The bark and rind are, previous to exportation, stripped from the pith, which is then called *Bok-shung.* The iron knife used for cutting this pith weighs about two and a-half pounds, and is of the roughest and coarsest workmanship. In cutting, the knife is kept quite steady, the cylindrical pith being moved round and round against the edge of the knife, which is just inserted into the substance, and thus a leaf or sheet is formed resembling the most delicate paper, but rather thick in substance. When brought quickly from the workman's hands, the paper is in a damp state. It may have been rendered so in order to facilitate the smoothing and pressing. It is said that there is a neat method of joining this paper when broken, and that it is chiefly made from the smaller pieces of the *Bok-shung*, and that the larger pieces are used in medicine in the same way as Epsom salts. It is vain to conjecture, from the pith alone, to what plant or tree this exquisitely beautiful substance belongs. The vulgar opinion still generally prevails, that because it bears the name of rice-paper, it is manufactured from rice; but the slightest inspection with a microscope exhibits the exquisitely delicate medullary portion of a dicotyledonous stem. Again, from an affinity with the well-known *Shola* of the East Indies, (of which floats and buoys for fishermen, and the very light hats of Sincapore are made,) many have supposed, and even Chinese travellers have declared, that Rice-paper is made from this, the Æschynomene paludosa; but a comparison of the two will clearly show the difference. Both are light and spongy, but the *Shola* is far less delicate than the *Bok-shung.* A Chinese drawing of what is said to be *the Rice-paper plant* is in possession of Dr. Lindley, but neither flower nor fruit is represented. Some have conjectured this t be a malvaceous plant, others araliaceous. We have seen in the branches of the common fig (Ficus carica) a copious medulla, very much resembling, in its texture and pure whiteness, that of the *Bok-shung.*—*Hooker's Journal of Botany*, ii., 27.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR FEBRUARY.

FLOWER GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Aided by such cultivators as those who have undertaken the Plant department of this Calendar, the decoration of the Conservatory will become an easy matter. At the present time it should be gay with Camellias, Heaths, Epacrises, Indian Azaleas, Primulas, Scarlet Geraniums, Euphorbias, Poinsettias, Justicias, Aphelandras, Epiphyllum truncatum, violaceum and Ruckerii, Amaryllis; Bletias, Dendrobiums, &c., from the Orchid-house; and Hyacinths, Narcissus, Tulips, Rhododendrons, Azaleas, and other American plants, and some few fairy Roses from the forcing-house; and, though last, not least, Mignonette, Neapolitan and tree Violets from the frames. These, intermixed with the regular occupants of the house, will give it a gay and interesting appearance, even during a protracted reign of the Ice King, who appears loath to relinquish the firm hold he has taken of us. The temperature of this house, for the sake of comfort, as well as for the preservation of the tender flowers, must range from 45 to 55 degrees, rising a few degrees by sun-heat; but on very cold nights it is better that it should fall below 40 deg., than that a higher temperature should be maintained by fire-heat only. Sprinkle all vacant parts of the house daily, to generate a moist, healthy atmosphere; and Camellias, the buds of which are swelling, will be benefited by a light syringing twice or thrice a week with tepid water. Keep a sharp eye upon insects; clean plants,

prune, and train creepers on rafters and trellises; and where the plants in borders require it, remove the old, and replenish with new soil.

Flower Forcing-house. — As fast as the blooming plants are removed to the conservatory, introduce fresh ones from the reserve-pits, such as Indian and American Azaleas, Rhododendrons, Lilacs, Roses, &c., placing them at the cool end of the house, and removing them forward as space can be had. Introduce also, for succession, Hyacinths, Narcissus, Tulips, and other bulbs; water them freely when they begin to grow, and take care more especially of the bulbs that they never know the want of water. Maintain a temperature of from 55 to 65 degrees, rising 10 or 15 degrees with sun-heat; but, on very cold nights, a temperature of 50 degrees will be sufficient. Syringe morning and evening with tepid water, and keep a sharp look out for, and destroy, insects of every kind.

Reserve-pit.—All plants intended for early forcing should be under cover somewhere, and must be protected from frost as much as possible. American plants, Roses, &c., may be placed under the greenhouse stage, or even an open shed will be preferable to full exposure. If part of the pit can be spared, fill it with leaves, tan, or hot dung, and introduce Moss, and some of the finer kinds of Bourbon, Tea, and Hybrid China Roses; also a few plants of Smith's forcing and Anna Boleyn Pink. A few pots of Lily of the Valley may also be started very gradually; and Cyclamens will also bear a little forcing. The temperature of this pit should not exceed 40 to 45 degrees, by artificial means; but it may rise to 55 or 60 degrees, in bright sunshine. Syringe daily in the morning. Keep a sharp look out for insects.

A.

Orchid House.—The most important point to attend to in this house, at this season, is, to avoid all excitement; and, to this end, keep the atmosphere by day from 60 to 65 degrees, and by night from 50 to 55 degrees. Where there is a second house, it might range from 7 to 10 degrees lower, providing the plants have been properly selected, are chiefly of the Mexican species, and are in a dormant state. For the purpose of retarding the blooming of some of the finer kinds of Dendrobiums, and many other fine Orchideæ, such a house is indispensable; and, if their growth is thoroughly matured, no fear need be entertained of their sustaining any injury. What can be more desirable than to retard, or, where there are a number of plants, prolong the season of blooming of such magnificent things as the Dendrobiums? Let such plants enjoy as strong light as possible, but no sudden or bright sunshine. Give neither water nor steam; avoid cold draughts of air; and keep the plants in as torpid a state as possible. Plants which are making growth, must be placed in good quarters where they can be duly attended to. Water such only as are growing, but give no moisture overhead at present, neither raise moisture from any heated surface. Endeavour to keep the atmosphere fresh, agreeable, and healthy, by sprinkling the floor, wall, tables, &c., once or twice a day. Concentrate the floral beauty of the house, by arranging the blooming plants in groups, where they can be readily examined and enjoyed. Wash the plants carefully with a sponge, and, if necessary (before they expand), the flowers also. Should insects obtrude themselves, wage a war of extermination against them at every point, and never rest until the enemy is completely routed, and the field is clear to yourself.

Plant Stove.—Let the temperature of this house range from 50 to 60 degrees, by fire-heat, rising a few degrees with air when the sun shines. Give air with care daily, if possible, but avoid cold currents near growing plants. Avoid undue excitement for the present, but keep a healthy growing atmosphere, as, towards the end of the month, most plants will begin to move a little. Plants of Stephanotis, Allamanda, Dipladenia, Rondeletia, Clerodendron, Manettia, and others of similar habit may be pruned and repotted, removing a part of the old soil from the roots, and replacing it with a compost of good turfy loam and peat, mixed with a little leaf-mould, broken charcoal, and some silver sand. Start a few Gloxineas, Gesneras, and Achimenes, especially such as may show signs of early growth, using the same compost, and some thoroughly decomposed horse-dung. Water sparingly until the plants begin to grow freely. Avail yourself of every leisure moment to destroy insects and clean the plants.

Routine.—Prepare pots, crocks, charcoal, soil, sand, &c., preparatory to the busy season, which is at hand; and, for the Orchids, plenty of turfy peat and loam, leaf-mould, sphagnum moss, potsherds broken small, and lumps of charcoal of various sizes. These should always be ready; as should also blocks and baskets of various sizes, made from the most durable kinds of wood, such as the various kinds of Cratægus, Quercus, Robinia, Ilex, Taxus, Gleditschia, and Cedrus, all of which the plants like, and which should be ready at all times, so that the plants, when they require it, can be shifted without delay. Next month we shall have something to say about potting Orchid, &c.

J. G.

GREENHOUSE HARD-WOODED PLANTS.

At the beginning of this month, no time should be lost in forwarding the different operations as much as possible, for in a short time there will be so much to do that we shall hardly know what to set about first. Peat being the soil chiefly used for greenhouse plants, should be prepared for use in large quantities; also some of the best loam. Attend regularly to watering, and, if possible, use the water of the same temperature as the house. Air should be admitted freely when the weather is mild, but be careful to exclude cold drying winds. A night temperature of about 40 degrees—not more—in frosty weather, is quite sufficient, and always damp the floors and shelves after fires.

Crowea saligna, if stopped in, and shifted into some good peat and sand, and put into the stove or forcing-house, will commence blooming about June, when, if placed in the greenhouse, it will continue to flower finely all the autumn.

Boronias of all sorts will make fine plants with the same treatment, only move them into the greenhouse about the end of April, and stop them occasionally during the season of growth.

Sollya linearis, (the best variety,) should be shifted in this month. Allow the shoots to grow as they will till April, when you can train them into any form you please.

Kalosanthes.—The different varieties should now be shifted, using a light rich soil; let it be rather rough for large plants. Those not wanted to flower this season may be stopped in, and will make excellent specimens for another year.

Astelma eximia generally requires a shift at this season; it should be potted in peat and sand, and placed in a dry part of the house, in order to preserve the foliage from damp.

Azaleas, of the best sorts, will grow rapidly if shifted liberally, and placed in a warm and moist part of the stove or forcing-house. These plants delight in good strong fibrous peat, with a little loam and plenty of sand. Tender-rooted varieties, such as Lateritia, Exquisita, and a few others, do best grafted, using Phœ-

nicea for a stock; but all the strong-growing varieties are best on their own roots. It is, however, too early to shift them yet, unless you have plenty of heat at command.

Camellias advancing into bloom will be benefitted by syringing about twice a-week, particularly in frosty weather, when it is necessary to employ fires.

Routine.—Towards the end of the month is a good time to make a selection of young hard-wooded plants, such as Chorozemas, Pimeleas, Dillwynias, &c., and to give them a good large shift. If they do well, they will be ready for shifting again about June, and will make beautiful flowering plants for next year. Be quite sure that the roots of the plants are moist at the time of potting. Keep a sharp look-out for insects and mildew. Some plants, such as Leschenaultias, Sollyas, Pimeleas, &c., are very subject to green fly. During winter, remove them from the house into some box or close shed, and fumigate them, but be careful not to do it too strong. The house should now be gay with the different varieties of Epacris, Correas, Acacias, Daphne indica, &c. Be sure to avoid crowding them together.

Lose no opportunity for tying and cleaning the plants under your care. You may often see a plant that looks dirty: take it out of the house some fine morning, and give it a good syringing. Minute attention is very essential to the well-being of plants generally; in fact, good plants cannot be grown without it.

J. F.

Heathery.—As, during the late severe weather, fires have been obliged to be used, it will be necessary to look the plants carefully over, and see that none of them are suffering for the want of water. It will frequently be found, after using fires, that the bottom of the pots are quite dry, though the surface-soil is comparatively wet; and to ascertain this it will be necessary, in some cases, to turn the plant out of the pot, to examine the state of the ball. If it should be found dry, place the plant immediately three or four inches deep in water, and let it stand for twelve or twenty-four hours, until you are quite sure it is thoroughly saturated, then set it to drain. To ascertain whether a plant in a large pot is dry, give the pot a sharp knock upon the side, with the knuckles, and if it rings quite clear, be sure it is dry and requires a thorough watering; but, if it has a dull heavy sound, no water is required, but, on the contrary, it may be necessary to place it in a dry, airy situation, to disperse some of the superfluous moisture. Avoid fire-heat as much as possible, and, if it should be found necessary to use it, never allow the house to exceed a temperature of 40 degrees. Give air plentifully at all times, but guard against cold, north-east winds; for even Heaths, hardy as they are, do not approve of them. Some of the plants will now be showing bloom, and, where they are required for exhibition purposes, it may, probably, be necessary to retard some kinds, and to promote the growth of others, so as to have them out in time. Pick off the flowers of such kinds as E. mutatiles; and young plants intended for growth, and not for blooming, should also have the flower-buds removed directly they are perceptible. Winter blooming kinds, such as E. hiemalis, Linnæoides superba, and the like, which have done flowering, should have the faded flowers removed, and also be thoroughly cleaned; and as soon as they show symptoms of growth, cut them closely in. Avail yourself of every leisure moment to clean and tie the specimen plants, using small green-painted sticks; but remember, sticks are only a necessary nuisance, and, therefore, the fewer you use, the more likely you will be to produce something like a perfect plant. Keep a sharp look out for mildew, especially among the downy kinds, as E. Massonii, Ferrugeinea, and others of similar habit, and destroy it by sulphur directly it appears. Abstain from syringing at present; but when the winds are very drying, or you are obliged to use fire-heat, damp the paths, and among the pots on the stage, twice or thrice a week.

Heath Pit.—Young plants in pits will require to be carefully protected from frost, and guard particularly against any accumulation of damp; ventilate freely at every favourable opportunity, and, indeed, remove the sashes entirely daily, when it is not freezing; water cautiously, and keep a close watch upon, and destroy mildew.

Routine.—As March will be a busy month for shifting the specimen plants, and most of the young stock, take care to provide lots of pots of various sizes, with plenty of broken potsherds, and charcoal in large and small pieces. Prepare soil also, and lay in a good stock of sand.

J. F. C.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—As the season is advancing, this class of plants will require considerable attention. Where large plants are required every care must be paid them, remove all decaying leaves, to admit a free circulation of air. When the plants are well rooted, re-pot them forthwith into pots, well drained, one size larger, using a rich compost of good turfy loam, cow-dung, and leaf-mould, with a little well decomposed night-soil and silver sand. Keep the plants rather close, for a short time, but ventilate freely afterwards, of course avoiding cold draughts at all times. Plants which do not require shifting must be thoroughly cleaned, thinning out the small leaves and branches, and have the surface of the pots stirred, and top-dressed. Pay timely attention to tying and thinning, and guard against insects. Water cautiously for the present, but never allow the plants to flag. Temperature, 45 to 50 degrees, with a little increase by sun heat and free ventilation.

Fancy Pelargoniums. This class of Pelargoniums is not quite so hardy as the former; therefore, it is necessary that more caution be used in potting them, always taking care that the collar of each plant is above the surface of the soil, as they are very susceptible of damp, and frequently shank off if this is not attended to; drain the pots plentifully with charcoal and potsherds. Thin the shoots, and tie out to admit the air freely, and water sparingly for the present. Temperature, 50 degrees, with a little increase by sun heat and free ventilation.

Cape Pelargoniums.—A few of these should now be started, to mix in the greenhouse with the other kinds, such as ardens, flexuosum, fulgidum, quinquavulnerum, Blandfordianum, triste, a night-scented variety, &c. Pot these in equal parts turfy loam and peat, with a small portion of cow-dung and silver sand, and drain the pots thoroughly. Temperature, the same as for the fancy class.

Calceolarias.—These, if well-rooted, should now be shifted into larger pots; remove all decaying and superfluous leaves, peg the shoots down that they may root up the stem, which will greatly strengthen the plants; give free ventilation every favourable opportunity, and guard carefully by timely fumigation against insects. Temperature, 45 to 50 degrees.

Cinerarias.—Pick off all decaying leaves, and give air freely, as they are very subject to mildew, and fumigate occasionally to prevent green fly. Remove a few of the more forward to a warm house, as they will be found useful for bouquets and other ornamental purposes. When large plants are required, a few may yet be shifted into good rich compost. Temperature, 45 to 50 degrees.

Fuchsias.—Cut the old plants down, and start them in a gentle heat. When they have broken, thin to three or four shoots to each plant, and pot them into a rich compost. Plunge them afterwards in a gentle bottom heat, and shade them when the sun is very warm. If large plants are required, pick off all the first flowers, when they will grow more vigorously. When well-rooted, water freely. Give free ventilation on all favourable occasions. The secret of growing fine Fuschias is to begin in time, and never allow the plants to receive a check until they are of the size required. Temperature, 50 to 55 degrees.

Routine.—Prepare dung and make up a hot-bed, and, when properly sweetened, put in cuttings of such plants as it is desirable to have in abundance, that they may be ready in time; as Petunias, Calceolarias, Salvias, Verbenas, Heliotropes, &c., all of which make fine ornamental plants. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

Since the system of arranging flowers in masses was introduced into our flower-gardens, there is altogether a new method adopted of keeping and propagating plants for decorative purposes; and this is so very simple and natural, that it only requires a little close attention to the habits of the plants, during the time they are growing in the beds or borders, to be able to propagate them successfully, both in the autumn and spring months, and also preserve them—in very large numbers, too—in a comparatively small space, and at no great expense either.

Such being the case, we hope to enlist on our side even some of the very least informed of our readers in flower-gardening, believing, as we do, that however little they may gather from us, if that little but enables them to acquire some experience of their own, their pleasure in flower-gardening will be increased, and they will also be in a better condition to profit by the instructions of others.

The principle of massing plants in flower-gardens, so as to make one colour set off another by contrast, gives a dignity and expressiveness to the scene, when worked out with sufficiently large masses, which the small artist's dotted and promiscuous method never can produce.

In altering the outline of any beds, never forget that the circle, or some modification of it, is the most expressive of all figures, and more consonant with the massing of flowers than any other, and by far the most beautiful of lines to follow, as well as the one of all others which most enlarges the appearance of a place. Every bare piece of grass and irregular edging should be made good without delay. Walks should never look mean, stiff, nor too much confined by shrubbery; but if intended to be straight, let them be so; on the contrary, if curving here and there throughout their length, these curves should vary in size, and appear as expressions of some features in the grounds, just as the advancing and receding lines in front of a shrubbery tell of something on the lawn.

Proceed with the pruning and thinning out of hardy Roses; but leave the tender sorts until the dead shoots can be distinguished from the living: if the latter have been covered up, open two holes in the protecting material on fine days, one on the north side near the ground level, and another on the south side at the top, to carry off damp, and keep down the temperature, till they can be quite exposed.

Rock Plants.—See to a good stock of the following sorts for a spring show:—Aubrietia purpurea, Alyssum saxsatile, Arabis præcox, Cheiranthus ochroleucus, Polemonium mexicanium, Phlox verna, Vesicaria utriculata.

Propagation by Cuttings.—Verbenas, Lobelias, Petunias, and Fuschias, may be rooted in a hot-bed, if kept near the glass. Dahlias should also be put in heat, if a great stock of cuttings is required. J. C.

Rose Garden.—During open weather, towards the middle of the month, commence pruning the hardy kinds, such as the varieties of Provence, Moss, Gallica, Damask, Hybrid China, and others that flower in June and July only, leaving the perpetuals till March and April. The Banksian Roses must not be cut at all at this time of the year, but have all the shoots nailed or tied in, and left till they have done blooming. The Austrian Briers, with flexible branches, such as Harrisonii, should have the very weakest shoots thinned out, and the others left full length, or have only the extreme points taken off. The other varieties, with stiff rigid shoots, like the Copper and Persian yellow, must only be thinned out, and the shoots that are retained left their full length. Climbing Roses on poles, and against buildings, may also be undone and thinned out, and, if the poles are the least decayed, they should be replaced with new ones, or what is better, living Larch Firs, about the height required, may be taken up with the roots uninjured, thin the side branches to within three or four inches of the stem, leaving the top, with about six side branches, to grow in height. These, if planted against the Roses, will make excellent supports, and never want replacing; and any unsightly shoots they make in summer may be trimmed out. Clean all the stems of standards, and, where any strong shoots have been cut off, cover the cut with a thin coating of grafting wax, which will prevent insects laying their eggs in the pith. Get all hardy kinds planted as soon as possible, taking care the ground is rich, and in good working order. Standards, as soon as planted, should be tied to a neat stake, to prevent their being moved by the wind; after planting, the surface of the ground should be stirred up with a light spud or fork, and left rough till May. Beds intended to be planted in May, with plants that have been kept in pots during winter, should be frequently turned up, especially during dry frosty weather. Get a good quantity of soil dry, ready for potting for next season's forcing. Use of good strong loam one bushel, rotten hot-bed dung one peck, and half-a-gallon of pigeons' dung, or, if the latter cannot be procured, deer, or sheep's dung may be substituted, using double the quantity.

Forcing Pit. — Continue to introduce plants that have been previously prepared into the forcing-house, or pit, the temperature of which should not exceed 45 degrees by night, and 55 degrees by day, till they are well started. Give plenty of air at all favourable opportunities, examine them closely every day, and destroy insects as soon as they make their appearance. A little dry Peruvian guano sprinkled on the surface of the soil, so that its virtue may be conveyed to the roots in watering, will be of great benefit to them. H. M'M.

Arboretum.—It is important that whatever planting in this department remains to be done, should be vigorously proceeded with in open weather. Should it be unfavourable for that purpose, the time may be fully employed in trenching up large spaces of ground, where the planting is intended to be general, or otherwise digging out large holes for single specimens, to which may be carted or wheeled the necessary compost, so that not a day may be lost when the weather is suitable for lifting and planting. Trees which require to be secured from the effects of high winds, and which are too large to be made sufficiently so by tying to a small neat stake, should be secured as the planting proceeds. It being desirable to avoid the appearance of large, unsightly stakes, I would recommend a plan by which I have succeeded in

amply securing trees from ten to fifteen and eighteen feet in height. It is a modification of the well-known plan of using three posts, with rails nailed to them over the balls. I select for each tree three stakes, the length and size of which is regulated by the diameter of the hole in which the tree is planted, and the strength required by the size of the tree. As an average rule, stakes of two inches in diameter will do; one end must be pointed; and, after the tree is placed in its position, and the soil firmly pressed round the ball of earth to a level with the top of the roots, I place a stake across the ball, not more than eighteen inches from the trunk, and drive the pointed end firmly into the side of the hole; the other end is then bent down, and secured with a strong, hooked stake, two feet long; the other stakes are then disposed triangularly in the same way. In many cases, two stakes parallel to each other will be sufficient. Elm-wood is the best for both stakes and hooks.

Shrubbery.—The preparation of ground for planting will fill up the intervals of bad weather, but every opportunity of planting must be employed, as this work ought to be brought to a close as soon as possible. In planting, keep all the tall-growing sorts in the middle or back ground, and bring the choicer and dwarfer-growing kinds near the edges, in order to preserve a dwarf and compact habit of growth, and also to induce a more abundant inflorescence. It is of great advantage occasionally to take up the plants round the borders of large masses of shrubs, then to trench the ground, and replant; this, combined with judicious pruning, has a very beneficial effect. Beds and borders of American plants may be dressed with a good covering of decayed leaves, which should be raked level, but not forked in. The operations of thinning, and pruning, and digging up the borders of shrubberies, must be proceeded with. By no means allow the evergreens to get the lead, or it will entail considerable trouble, and extra work, in after years. J. C.

Florists' Flowers.—Until a favourable change in the weather shall take place, many operations requiring to be performed must of necessity stand over; particularly where the plants to be operated on are in cold frames, or sealed up by frost and snow in beds.

Auriculas.—These will now require a careful examination, as all decayed leaves must be removed, and where any premature pips should appear, they should be nipped out; but not too soon, as sometimes more harm is done by the operation than by their growth. The soil should be loosened for an inch or two, and the plants top-dressed with well-decomposed cow-manure, leaf-mould, sand, and charcoal; after which give a slight sprinkling, and as much air as the state of the weather will permit.

Carnations and Picotees.—Soil for repotting these should now be ready, and layers that have been wintered in small pots should be placed at once into the pots in which they are intended to bloom. The pots plunged in coal ashes up to their rims. A slight protection only is necessary.

Dahlias.—Where a great quantity of any are required, the roots should now be started; but where only a few are needed, it may be deferred for a time. Be careful in starting the roots not to give them too much or too moist a heat, as, coming from cool dry winter quarters, the great change often proves injurious. Those not required to be placed at work, should be carefully looked over, and all decayed portions cut away, taking care that the labels with which they are marked are secure.

Phloxes.—The perennial varieties of this interesting class of flowers are now so numerous and beautiful as to deserve more care than they usually enjoy. The plants that were struck last season and kept in pots, should now be brought into a gentle heat, where they will soon make cuttings, which should be taken off and struck. Seeds that have been carefully saved may now be sown, and, when up, treated as cuttings.

Pinks.—When the weather will permit, see that the plants are all secure, as no doubt the continued frost may have loosened them. They should have the soil pressed firmly to them; but, by no means, till the action of the weather should have fitted the soil to the purpose, as it is very injurious to their future growth to have wet soil pressed about the roots. Seedlings, raised and wintered in pans, may now be planted.

Pansies.—Where these are growing in beds planted in the autumn, they will require the same care and attention as is necessary for Pinks; those wintered in small pots in cold frames may now be planted in the beds in which they are to bloom; or, if to bloom in pots, they should be placed into the pots intended for their blooming, plunged in coal ashes up to their rims, gently sprinkled, and subjected to all the air possible. Seedlings may now be planted, and any seed remaining in hand sown.

Ranunculuses.—Carefully look over the stock of these, and as soon as the beds are in a fit state, lose no time in planting; but waiting a day, or even a week, is nothing in comparison with placing the roots in soil in an unfit state. Decomposed cow-manure forms the best stimulant for promoting the growth of these delicate and beautiful flowers.

Tulips.—Where the beds of these have been unprotected during the winter, it would be better now that they should be hooped over, and protected when necessary; as the bloom, which lies concealed, is often injured by the various changes of cold, hail, and sleet, often accompanied by frost and sunshine. The soil should be loosened with care, so as not to injure the bulbs. T. B.

FRUIT GARDEN.—IN-DOOR DEPARTMENT.

Pinery.—Of the two systems on which Pines are now principally grown, it may be observed that, by the "Meudon" or open-bed system, larger fruit may be obtained late in the season, and at less expense; but it remains to be proved whether plants can be excited sufficiently early to ripen their fruit in May and June, a period when it is of most value. When the fruiters are planted on the open-bed system, and fruit is required by July, proceed gradually to increase the day temperature to 75 and 85 degrees during sunshine. The thermometer may fall to 65 degrees during the night. Admit air daily, if possible. While the plants are showing and flowering, keep the atmosphere dry, and in motion if practicable; the bed in which they grow will, in all probability, be moist enough for the present. Fruiting plants *in pots* will require the same general treatment. Should, however, the bottom heat decline, contrive to renew it without moving the plants, which should be avoided by all means. From this time, a bottom heat of between 80 and 90 degrees will be best. Water if at all dry. Plants intended for autumn fruiting must be kept growing steadily; and carefully avoid all sudden transitions of treatment, which would most likely cause them to show fruit prematurely. Fruit now swelling will require a genial, moist heat, ranging between 60 and 80 degrees. A regular, but not large, admission of air and water, when requisite. When colouring, keep them drier, and allow more air. *Succession Plants*, of all descriptions, will, for the present, require a moderate amount of heat, avoiding damp if in dung pits, and

guarding against sudden changes. Supply air as liberally as circumstances will allow.

Vinery.—A most critical time has passed over for vines that have been forced early. Continued hazy weather, and absence of sunshine, will tell on the early crop, unless you have abundance of heating power, light houses, and dry warm borders at command. Vines, now blooming, require much care and attention. A dry night temperature of sixty-five degrees for Hamburgs, and seventy for Muscats and Sweetwaters, will be required to make them set well. Increase the above ten or twelve degrees during the day, with a ventilation adjusted to prevent cold draughts in any part of the house, and modified, so as to act gently, though perceptibly, throughout the night. Tie down shoots, and stop laterals, and thin directly the berries are formed. Prune straggling and ill-formed bunches, to make them compact and handsome. Whatever way the external border is heated, care will be required to keep it in a uniform state; if the surface of the border can be kept between 65 and 75 degrees, the best results will be obtained. Borders inside the house will require water occasionally. Where vineries are now being started, presuming the vines are pruned and dressed, commence with a genial moist atmosphere of 45 degrees artificial heat, and slowly increase it 10 or 12 degrees in the course of a month, always allowing a rise of 10 or 15 degrees by day.—(See directions above, respecting borders). Disbud the shoots when breaking, and train carefully. Proceed to prune and dress all late vineries, and make every preparation for starting successional houses, according to the demand for grapes. J. S.

Figs.—The first crop of Figs is produced from the points of the shoots of the last year. To insure a good crop, the first object is to have plenty of young wood in the trees, whether grown as bushes or trained in the fan-manner. But in doing so, too much young wood must not be retained, that being as bad as having too little. Previous to forcing being commenced, the borders should be well watered. By well watered, I mean every particle of soil should be wetted. It is a very general complaint that the young Figs of the first crop are exceedingly apt to turn yellow, and drop off. By taking off the point of every shoot, when the trees are pruned, I get more Figs than it is necessary to ripen; I am therefore necessitated to thin the fruit. When the terminal bud is left to expand and grow, the greater number of fruit always turn yellow, and fall off, which may be explained in this manner:—The terminal bud, in its development, robs the young shoot of all its organized matter, and the consequence is, the embryo fruit die off for want of their proper food; and, when the terminal bud is removed, the young Figs have all the organized matter in the shoot for their nourishment. A temperature, varying from 55 to 65 degrees, and during sunny weather ranging higher, will suit the Fig till the leaf is developed, when it will require a much higher temperature. A moist atmosphere must at all times be kept up.

Peaches.—To succeed well in forcing Peaches, we must know and well consider all the circumstances that surround it in its native clime. From these we learn, that light is, in all stages of its culture, a most essential agent, and that, when forced, it must be flowered under a comparatively low degree of temperature. Begin with a temperature of 40 degrees, then raise it to 45, afterwards to 55, which must not be exceeded till the fruit is set. Then raise to 60, which may be considered the standing point until the stoning is over. Then raise to 65 and 70. This, be it understood, is the amount of artificial heat aimed at under ordinary circumstances. The weather will often cause wide departures from this. If the weather be bright, mild, and sunny, when forcing is commenced, little artificial heat will be required; and, if it be severe and frosty, the standard laid down above will be a safe guide. Excepting the time of flowering, a moist atmosphere should be maintained. Air should be given as early in the day as the weather will permit. Trees in flower will require all the air possible, and a steady temperature of about 50 degrees at night. Trees just commenced will be benefited by being syringed three or four times daily. If the borders were well watered, when forcing commenced, they will require but little until the leaf is fully expanded, when they will require to be supplied liberally, if the trees are large and healthy.

Strawberries.—Success in Strawberry forcing will, in a great degree, depend on the condition the plants are now in, and the treatment they have received during the previous autumn. If the plants have well filled the pots with roots, and these are now in a healthy active state, and if the crowns are well formed, then success is, under ordinary treatment, certain. But if, on the other hand, the plants are badly rooted, and the crowns badly formed, they will then be, under the most favourable circumstances, more trouble than profit. To keep up a regular succession, a fresh supply of plants must be introduced into heat every fortnight. An essential point to obtain good fruit is, to get a healthy and vigorous development of foliage. To secure this end, the plants should have all the light possible at this season, abundance of air, and a moist atmosphere, except when in flower. Shelves at the backs of peach-houses, vineries, &c., and suspended from the rafters, answer admirably well for Strawberries. The temperature should at first be low, and be raised gradually. Plants in flower should have all the air possible,—otherwise they will go blind,—and a dry atmosphere, with a temperature at night about 50 degrees. The small flowers should be pinched off, and when a sufficient number of the best are set, the remainder should be removed. The moment green fly appears on the plants, they must be fumigated. M. S.

Cucumber House.—The temperature in this house should be regularly kept up to 70 degrees by night, and 75 degrees by day, permitting an increase of from 10 to 15 degrees by sun-heat. Sufficient artificial heat should always be used to admit of air being given freely every day; but particularly avoid draughts. Maintain a moist growing atmosphere by sprinkling the pipes and floor of the house three or four times a-day, where tanks are not used for this purpose. Syringe the plants every sunny day. Should the red spider make its appearance, this operation must be more rigorously carried into execution until this pest is totally annihilated. If mildew attacks the plants, syringe and sulphur the affected parts immediately it is perceived, and continue its application until the pest is entirely got under. Stop the shoots at every second joint as the fruit appears. Barren shoots are better removed entirely, in order to avoid a confusion of vine. Impregnate every fruit that is intended to grow to perfection, and introduce them into glass tubes. Should these not be at hand, support them in a horizontal position, and turn the curved point of the fruit upwards; their weight will straighten them. Plants that have become exhausted from bearing or otherwise may be cut back and re-started, or entirely removed, and be replaced by young ones. Examine the soil, and as soon as roots are seen protruding from the surface, mulch them with an inch or two of rich loam, and rotten dung. Be careful not to saturate the bed with water, but give sufficient to keep it moderately moist, and, if the plants have been long established, weak liquid manure may be alternately used with soft water, using it always at the same temperature as the house. Let the bottom heat exceed the top by 10 or 15 degrees.

Dung-beds.—Where the dung-bed has not been previously made, the manure should be immediately thrown together, and turned twice a-week until it has parted with its rankness. Proceed then to construct a bed three feet high, and six inches wider on all sides than the frame, beating it firmly with the dung-fork. Place on the frame, and press it closely down. Make a lining of two feet in thickness, and within six inches of the top of the box. Insert a thermometer a foot below the surface of the dung, and examine it every morning until it stands between 70 and 90 degrees. The top heat should not exceed 65 degrees. Sow the seeds in light, rich, sifted soil. Keep the pots near the glass, and tilt the lights a little at the back of the frame, in order to strengthen the plants, as well as to permit any rank steam that may be present to pass off freely. As soon as the seed leaves of the plants are fully developed, pot them off singly into 48 size pots, into a compost of leaf mould and light loam, in as rough a state as possible. Water them with a fine-rosed watering-pot, and replace them in the dung-frame.

Melons.—Sow the early scarlet fleshed kinds in a strong loamy soil, and give them in other respects the same treatment as specified above for cucumber plants. Towards the latter end of the month sow green-fleshed, and Persian kinds for succession. W. T.

FRUIT GARDEN.—OUT-DOOR DEPARTMENT.

The planting of fruit-trees, where it has yet to be done, should be proceeded with at the earliest favourable opportunity. The Autumn is unquestionably the best time for planting, for we hold it as a rule, that when the soil is retentive of moisture to a degree injurious to Autumn planting, it is not in a fit state for fruit-trees, and therefore proper means should be used to make it so by draining, and adding to the depth of soil when necessary. In planting, care should be taken to keep the roots near the surface, particularly if it is a cold, retentive subsoil: the roots should be carefully spread, and some finely broken soil laid over them, so that every root is in contact with it; there is then no necessity for treading the soil about them. It is an old and bad, but even now a common practice, to lift a tree up and down after covering the roots with soil, thereby not only displacing and breaking many of the small fibrous roots, but also causing shoulders in some of the larger ones, and from which ultimately spring up numerous suckers. There is another common practice which appears to be wrong in principle: it is that of digging a hole just large enough for the roots of the tree, and filling it up with highly enriched soil, or even, in some cases, with rotten dung; in this the tree is planted, and it gives them what is commonly termed "a start," but it appears to be a most unnatural one. In the first place, they gain a plethoric luxuriance, which is by no means to be coveted in fruit-trees; and in the next place, the severe check they receive when the roots get beyond the influence of the highly enriched soil, not unfrequently produces disease, which they ever after feel the effects of. A portion of leaf mould, mixed with the natural soil, may be advantageously used for planting the trees in.

Apples and Pears.—Pruning should be proceeded with, unless during frosty weather, when it is highly improper to do so, be they young or old trees. Those covered with moss or lichen, will be greatly benefited by having the stems and larger branches scraped, and afterwards dressed with lime and soot, mixed with soap suds to the consistency of thick paint, which may be laid on with a painter's brush: this will destroy the moss and lichen. To destroy it on the smaller branches, throw over the trees dry wood ashes, or a mixture of dry lime and soot, while they are wet with rain or dew.

Apricots.—Prune and nail as the weather will permit, and if a covering is used to protect the blossom, it should be made available by the middle or latter end of the month, according to the aspect of the trees. Canvas curtains, which can be removed at pleasure, are undoubtedly the best protective material.

Fig.—When the trees have been protected by tying the branches in straw, or by other means, the protection should be removed by the middle or latter end of the month. Little winter pruning is necessary, if proper attention has been paid to summer pruning.

Grape Vines should have been pruned in October, but where this has been neglected, they should be pruned forthwith.

Peach and Nectarine.—Prune the latter end of the month, and dress the trees by hand, with the following wash, before they are nailed:—Scotch snuff, fresh slacked lime, and sulphur vivum, of each one pound; mix well together, with urine and soap suds, to the consistency of paint, at the same time adding sufficient soot to make it dry, of a dark colour; lay the mixture on the trees with a small brush: or the walls and trees may be washed with the garden engine, using hot water, to which is to be added sulphur and soot.

Plum and Cherry.—Prune and nail: clear out with a knife all gum and canker wounds, and afterwards plaster the part with cow-dung and clay.

Currants and Gooseberries.—If not yet pruned, let it be done immediately. The pruning of the Gooseberry is sometimes left until very late in the season, in consequence of the bullfinch being so destructive to the buds, but the gun is a remedy for that. When the ground between the trees is dug, attend to what has been recommended at page 11.

Raspberry.—Fill up, prune, and tie: it is an improvement in the old plan of tying to single stakes, to tie to an espalier rail. H. C. O.

KITCHEN GARDEN, AND VEGETABLE FORCING.

The operations to be performed, in this department, must be influenced by circumstances; for, while the ground is frozen, no decided course can be taken. All business connected with the wheelbarrow should be forwarded as fast as possible, and reserve heaps of manure placed on spots where it can be made available for dressing those quarters that are soon to become vacant.

Now is a good time to prepare Pea-sticks, and other sticks requisite for Kitchen Garden purposes. Fork the ground between Cabbage plants, rows of Spinach, Lettuces, and other crops, as soon as they commence growing. Dig up and trench all empty spaces as they occur; roll walks; plant and repair box edgings, and prosecute alterations without delay, for the Spring is rapidly approaching, and will bring with it its own work. Sow Peas and early Long-pod Beans, in a sheltered situation; of the former, Isherwood's Railway, Warner's Emperor, and Fairbeard's Early Surprise, are among the best. Of the early varieties, the first of these, however, (though very early,) is a light cropper. Where not already done, it would be worth while to sow a lot of Peas, in forty-eight size pots, and forward them in vineries or frames. Beans, too, may be thrown in shallow boxes, and forwarded in the same manner, until they are fit for transplanting into rows. By this treatment they will be ready for use before those sown in the open ground. Transplant Potatoes into their frames, and forward ash-leaved Kidneys in boxes for planting out in borders. Cauliflower plants will doubtless be scarce; a sowing made now in pans or

boxes, and placed in sufficient heat to germinate quickly, would soon be ready for pricking off, three or four each, into thirty-two size pots, to grow on till they have reached the size required; they then could be hardened off in cold frames without much trouble, after which, plant out and protect with glasses, or inverted pots, if necessary. These would come in almost as soon as the Autumn-sown plants. Sow Cabbage, and Lettuce, for succession in pans; early Horn Carrots, and Wood's Early Frame Radish, on a gentle hotbed; and Mustard and Cress once a-week in boxes, and placed in heat to insure a supply. Place fresh lots of Asparagus in frames, or pits, where there is a little heat, as soon as the previous lot pushes freely; an occasional soaking of weak salted water, at about 80 degrees, would be of great benefit. Give air freely in open weather. Introduce fresh batches of Rhubarb to the Mushroom House; cover the crowns of plants out of doors, with pots, and surround them with as much leaves and litter as will generate a heat of from 50 to 60 degrees. Cover Sea Kale, in the same manner, for a succession. Tie up and blanch Endive. Protect Broccoli, Lettuces, Celery, Endive, and young Cauliflowers, during severe frost, and expose them thoroughly every fine day.

J. C.

NATURALISTS' CALENDAR.

Beautiful is the order of nature as exemplified in the different seasons, and dear to our human sympathies are the varied aspects in which these are presented to us. The rich fragrance of the "leafy" months of May and June are relieved by the burning heat of the dog-days; and these, in their turn, are agreeably superseded by the autumnal tints of September and "brown October." Nor is the presence of ice-bound Winter altogether unwelcome to the lover of nature. Only yesterday the trees from our windows, from which a sudden thaw had swept every trace of their snowy garments, presented nothing for the eye to rest on save naked trunks and leafless branches; but this morning a scene altogether new is before us—a light, fleecy snow has fallen during the night, and every branch is loaded with its foliage of glittering snow; the slender branches of the Birch, and trees of a similar habit, are rendered more pendulous by the snow caught upon them in its descent; and even the sturdy boughs of the Oak and the Elm have acquired a more drooping appearance from the added weight; and the whole landscape seems as if pencilled in a frost-work of glittering silver. In some places, where the rays of the sun catch them, they glitter and sparkle like prisms of glass; and we find ourselves unconsciously proclaiming this to be a winter of the "olden time;" for such a picture has not presented itself to our eyes for many years.

> For "every shrub, and every blade of grass,
> And every pointed thorn seems wrought in glass;
> In pearls and rubies rich the hawthorns show,
> While through the ice the holly berries glow."

But such a scene, however charming it may be to the lover of nature, wrapped in his warm winter clothing, is by no means so attractive to the feathered tribes. As the cold increases they gather together in flocks, and, rendered bold by hunger, some of them approach the villages and farm-houses, while others shelter themselves among the long grass and stubble. Professor Macgillivray has, in his History of British Land Birds, adopted a mode of grouping the different genera, which it will be convenient to adopt for the purposes of this calendar. The first of these groups which we shall have to deal with is his order V.

Cantatores (Songsters).—Under this order he classes the *Turdinæ*, or Thrushes. Of these the Blackbird, *Turdus Merula*, and the Song Thrush, *Turdus Musicus*, begin to sing their song of love during this month. Perched on some branch of a tree, the Blackbird may be heard pouring forth his delicious song about the middle of the month, increasing in its ardour as the season advances, and pairing time approaches. The gentle musical song of the Thrush may also be heard towards the end of this month—probably two of them echoing each other with their sweet love notes.

Alaudinæ, the Larks, another family of the Cantatores, begin their song this month. Even in January, a bright day calls forth its sweet and lingering notes, as, floating flutteringly high in air, it sings its song of praise and adoration. About this time also may be occasionally heard the short, clear, modulated song of the Hedge-chanter (*Accentor modularis*). The Redbreast (*Erithacus rubecula*) may be seen in pairs this month, and the young have sometimes been found in the nests as early as the end of March. The song of this feathered favourite is rich, mellow, and clearly modulated; he sings perched on a bush or tree, even in dull, rainy weather.

Passerinæ.—Following the grouping adopted, we find embraced under it a number of families, whose average size is that of the House-sparrow, including the Chaffinch, (*Fringilla Cœlebs*,) the Greenfinch, (*Coccothraustes chloris*,) and the Yellow Bunting, (*Embereza Miliaria*,) whose song may be heard in favoured spots, during this month.

WILD FLOWERS OF FEBRUARY.

In this month, when the earth has scarcely put off its icy covering, the field botanist can scarcely expect a very full harvest, unless indeed he busies himself with some of the cryptogamous tribes. Still, a few plants are now in flower, and some exclusively in this and the previous and succeeding months. The Mezereon (*Daphne Mezereum*), a reputed native of this country, is now in blossom, the leaves appearing later; but it will not be very frequently met with, except in old-fashioned gardens. Its congener, the Spurge Laurel (*Daphne Laureola*), also flowers at this time, and is much more common; these two plants are interesting as being the only British representatives of an order which has a remarkable peculiarity of the bark—the liber is lamellated, and the layers may be separated in sheets. The West Indian lace-bark trees are of this order (*Thymeleaceæ*). The bark of the Mezereon contains an acrid juice, which has been employed for medicinal purposes. The Stinking Hellebore (*Helleborus fœtidus*) and the Snowdrop (*Galanthus nivalis*) are passing off, and will soon be succeeded by the Primrose (*Primula vulgaris*) and the spring Crocus (*Crocus vernus*), the latter confined to a few localities as a wild plant. That curious plant, the Butcher's-broom (*Ruscus aculeatus*), with its sharp leaf-like branches, now puts forth its inconspicuous flowers, seated on the middle of what seems to be a leaf, but is in reality a flattened branch, as is shown by the presence of the bract below the flower. The field Speedwell (*Veronica agrestis*) also occurs, dotted about among the furrows on arable land. The little crimson-tipped female blossoms of the Hazel (*Corylus Avellana*), may now be met with on the bare branches; they usually expand a little later than the male catkins. In mild winters they may often be found even at Christmas; but this will hardly have been the case this year. Of other early-flowering trees now in blossom may be mentioned the Alder (*Alnus glutinosa*), and the Yew (*Taxus baccata*).

A. H.

ENTOMOLOGY.

Several of the following insects make their appearance only on bright warm days, having been produced in the preceding autumn, when the increasing warmth revives them from their wintry sleep; but others are deve-

loped in the perfect state from the pupa at this period. This is especially the case with the different species of Moths given in the following list. Many of the Beetles and Apterous Insects mentioned below may be found almost throughout the year.

COLEOPTERA. *Carabus morbillosus.*—Under bark, and at the roots of damp trees.

Tachypus properans.—In gardens and grassy banks.

Cychrus rostratus.—Under stones, and moss, at roots of trees.

Notiophilus aquaticus.—Pathways, and banks of ponds.

Anchomenus prasinus.—In small communities under stones.

Harpalus æneus, and other species, under stones and clods of earth.

Dromius quadrimaculatus.—Under bark of trees.

Elater segetis.—In pastures and hedge-rows, under stones.

Ptinus fur—In houses.

Anobium tessellatum.—In rotten willows.

Colymbetes bipustulatus.—In ponds and ditches.

Dytiscus marginalis.
Acilius sulcatus.
Hydrous piceus.
Hydrophilus caraboides.
} In ponds under weeds.

Staphylinus morio.—Under stones.

Stenus cicindeloides.
Stenus biguttatus.
} On moist banks.

Opilus mollis.—In dry rotten willows.

Phosphuga atrata.—Under bark of trees.

Silpha opaca.—At the roots of trees.

Opatrum sabulosum.—In sandy places.

Helops striatus.—Under bark.

Rhagium vulgare.—In old stumps of trees.

Timareha tenebricosa.—In grassy places, on commons.

Chrysomela sanguinolenta.—In grassy places.

Coccinella 7-punctata.—Under bark.

HEMIPTERA.—*Nepa cinerea.*
Notoneeta fureata.
Notoneeta glauca.
} In pouds and ditches.

LEPIDOPTERA. *Gonepteryx Rhamni.*—In open places in woods and gardens.

Vanessa urticæ.—In gardens.

Eriogaster lanestris (the small Eggar Moth).—In hushy places.

Xanthia croceago (the orange upper wing Moth).—Among dry leaves.

Cheimatobia rupicapraria (the early Moth).—In hedges.

Hybernia leucophearia (the Spring Usher).—On trunks of trees.

Aploecra cæsiata (the February Carpet).—Skirts of wood.

Biston hispidarius (the small brindle Moth).—On trunks of Oaks and Sallows.

Oporinia nubilea (the clouded brown Tinea).—On Oaks.

Dasystoma salicis (the rosy Day Moth).—In hedges.

DIPTERA. *Culex pipiens* (the Gnat).—In houses and gardens.

Trichoeera hiemalis (the Winter Midge).—In gardens in small troops.

Scatophaga merdaria—On cow dung.

APTEROUS INSECTS.

Glomeris pustulata.
Armadillo vulgaris.
} Under stones.

Philoscia muscorum.—Under moss.

Julus terrestris.—Sandy places in woods.

Julus sabulosus.
Polydesmus complanatus.
Geophilus subterraneus, and various other species of *Millepedes*
} Under stones.

During the progress of the *Magazine*, it is intended to give, from time to time, coloured illustrations of the manner in which many of these insects exert their destructive powers on vegetation. J. O. W.

FISH PONDS.

FISH PONDS of late years have been much neglected. Near to the ruins of every old abbey may be found some remains of the fish-pond, filled up for gardening purposes, evincing that the flavour of a delicious Carp or Bream was not forbidden to their ancient inhabitants.

Whatever the old monks knew, however, on the subject of breeding and feeding fish, they have handed down no vestiges of their knowledge to their descendants; it has perished with them; and, beyond a few leading facts, we have little to guide us but our own observation and experience. There is a mystery about these dwellers in the water which to me is very fascinating, and I have always loved to watch them basking in the hot sun, darting swiftly upon their prey, or seeking their secure abodes and sheltered caves at the slightest intimation of danger. I have fed them, too, and learned, to some extent, what they like best, and also on what they thrive best, as well as what they absolutely reject. I have found that in certain waters, and on certain soils, they will breed rapidly, but not increase in size; while, in others, the reverse has been the case; I cannot but acknowledge, however, that there is as yet comparatively little or nothing *certainly* known, in spite of all that Yarrell, and the minor lights, such as Salter, Hofland, and many others have written.

Such directions, however, I can give, as will enable you, if wealthy, to turn your ornamental lakes and pools to the best account, by providing food for the poor, delicacies for your table, and sport for yourself and your friends; and, if your means be moderate, and your ground small, to secure to yourself at the least expense, a never-failing source of amusement, at the same time contributing materially to the house-keeping expenses, and, if you are near a town, giving you the satisfaction of making a pleasure actually profitable. Many people may try to convince you this is impossible, but, in my opinion, it may be done much oftener than you may suppose. Whatever directions you give, however, see yourself to their execution; and let your first principle in this, as in all other cases of domestic management, be cleanliness. Remember that fish can no more thrive in foul and impure water, than you could in a close or tainted atmosphere. Let dead leaves and rotten branches be raked off the surface of the pond, and let the shrubs that grow upon the side be kept carefully clipt and trimmed; they will otherwise hang down in the water, collecting around them a heap of floating matter, which will, besides the untidy appearance it will make, soon affect the purity of the water, and the health of your fish. I do not object to a few trees: their overhanging branches form a shelter from the heat of the sun, and are a great comfort to the fish in hot weather; while beneath their roots are the private retreats of the largest fish, where they are safe from the net of the poacher, and the tempting lure of the angler also, unless he be more than usually cunning. The best way to secure fresh and wholesome water, at all times, is to have a running stream through your pond; but this cannot always be effected, although it should always be attempted. Swans will keep down weeds, and save you a great deal of labour; but they destroy the spawn, and thus do a much more serious injury than the weeds themselves, which, if not allowed too rank a growth, are decidedly beneficial; as they are the resort of numerous insects, the natural food of the fish, and for the total want of which no artificial feeding can perfectly compensate. B.

S. Holden Sc.

Salpiglossis sinuata var flava.

SALPIGLOSSIS SINUATA, VAR. FLAVA.

Nat. Order, SCROPHULARIACEÆ, ? SALPIGLOSSIDEÆ.—(ATROPACEÆ, *Miers.*)

GENERIC CHARACTER.—Salpiglossis, *R.* and *P.*—*Calyx* tubular, ten-nerved, five-toothed, teeth almost equal, attenuated, rather obtuse. *Corolla* funnel-shaped, with tube cylindraceous at the bottom, campanulate above, compressed; limb five-lobed, oblique, almost two-lipped, lobes deeply emarginate, the upper larger, more erect; æstivation reciprocative. *Stamens* five, included, four didynamous, the fifth shorter, sterile; *filaments* subulate, arising from the constricted portion of the tube; *anthers* ovate, two-lobed, cordate at the base, sub-versatile, lobes adnate, bursting by marginal slits; *pollen* compound, composed of four granules arranged tetrahedrally. *Ovary* conical, seated on a fleshy, almost two-lobed disc, two-celled; *placentas* central, adnate to the dissepiment on both sides, many ovuled. *Style* exserted, compressed, thickened, and sub-incurved at the apex. *Stigma* rather large, transversely dilated, semi-lunar, two-lipped, emarginate. *Capsule* oblong, covered by the persistent calyx, two-celled, bursting septicidally with two valves; valves of a parchment-like consistence, bifid, at length separating from the central placenta. *Seeds* many, minute, sub-angulate, hilum lateral; testa striate-rugose. *Embryo* spirally curved within the fleshy *albumen*, round, *radicle* arcuate, directed toward the basal angle, four times as long as the cotyledons. (Miers, *in Ann. Nat. Hist.* 2nd ser. v. 30.)

S. SINUATA, *Ruiz and Pavon.*—Scalloped Salpiglossis.—Viscous-pubescent in all parts, inferior leaves lax, lanceolate, acutely pinnatifid-incised, superior shortly stalked inciso-dentate, teeth acute, floral sessile, linear, entire, bract-like; corolla marked with purplish lines, tube yellowish, limb straw-coloured. (Miers, *in Ann. Nat. Hist.*, 2nd ser., v., 31.)

SYNONYMY.—S. sinuata, *R.* and *P. Syst. Veg.*, 163; *Prod. tab.* 19. S. glutinosa, *Miers*, Trav. ii. 531. S. straminea, *Hook, Exot., Fl.* t. 229. S. picta, *Sweet, Br. Fl. Gard. tab.* 258; *Hook. Bot. Mag.* t. 3365.

Var. flava.—Corolla yellow, the tube darker, and purplish at the base externally, veins very pale, chiefly marked on the mid-veins and commissures externally.

DESCRIPTION.—Having only the drawing before me, no satisfactory detailed description can be given.

HISTORY, &c.—The drawing is from a plant raised by Messrs. Veitch & Son, of Exeter, from seeds sent home in 1842, by Mr. W. Lobb, who collected them in Chili, near Valparaiso, not far from Valdivia. It is an annual with us. I have referred it to the *S. sinuata*, since the only distinction I can find is in the colour, and this is admitted to be exceedingly variable. It is very close to the variety named formerly *S. straminea*.—A. H.

Many botanists regard all the different forms of Salpiglossis, long cultivated in gardens, as mere variations of one species; and, it is certainly true, that the seedlings are not very constant as to individual peculiarities; differing in this respect from Messrs. Veitch's variety, which appears more constant. Mr. Miers, however, who has paid much attention to these plants, and has had the advantage of studying them in their native localities, does not agree in the opinion that all the forms are of one species. He writes, "I found in Chili, plants, which I always considered to be two very distinct species, viz., *S. sinuata*, (my *S. glutinosa*,) and my *S. purpurea*; but, I have little doubt, that *S. picta, Barclayana, fulva, intermedia*, &c., are all hybrid productions from these two species. I always met with *S. sinuata* growing near the coast, its corolla being constantly of a yellowish white, with brownish stripes; on the contrary, I invariably found *S. purpurea* at a much greater elevation, near the foot of the main Cordillera, or within its gorges, its flowers being always of a dark lilac, with deep purple lines, and never of the yellowish hue so conspicuous in *S. sinuata*." Of this latter, Mr. Miers says, "its leaves are of more delicate texture, always longer, narrower, and more deeply incised into acute segments," than those of *S. purpurea*, of which latter Dr. Graham's *S. atropurpurea* is placed as a variety.

The generic name Salpiglossis is derived from the Greek *salpinx*, a tube, and *glossa*, a tongue; in reference to the tongue-shaped style in the tube of the corolla.

CULTURE.—This species requires a similar mode of culture to that bestowed on half-hardy annuals in general. Messrs. Veitch & Son state that their practice is to raise the plants in a frame, or on a hot-bed, and transplant them into the borders in May. Grown as a pot-plant for the decoration of the conservatory or the greenhouse, the varieties of Salpiglossis are very worthy of notice. For this purpose the seed should be sown, as before directed, in March, and for succession and Autumn blooming in May. When large enough, plant the seedlings three in a four-inch pot, in rich, light, porous soil; stop the plants to make them branch when they are strong, and three or four inches in height, and shift them into larger pots as it become necessary, using weak liquid manure when the plants are thoroughly established. In this way, by judicious stopping, plants two or three feet in diameter, and as much in height, producing hundreds of flowers at a time, and that for weeks in succession, may be produced, and that, too, with comparatively little trouble.—M.

Beech Tree;—Exogen.

Agave americana;—Endogen.

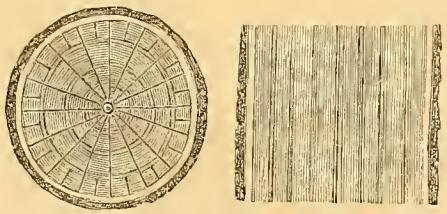
ON THE AGE OF TREES.

IN speaking of the age of trees, we insensibly use the term age, in the same manner as we do when speaking of animals. We talk of old trees, old animals, and old houses, as if the same processes had gone on in one as in the other. Yet, when we come to examine the nature of the changes which have taken place during the age of the one and the other, how different they are. Not more does the process of change in the old house differ from the tree and animal, than does the same process in these two. The animal has but one life, and this life is dependent on the harmony of the whole organization; whilst, if we examine a tree, we shall find it has (so to speak), many lives. Each bud is capable of an independent existence; nay more, many parts of the tissues of plants are capable of producing buds, and each cell has its separate and independent existence. It is here, then, that we see how different must be the circumstances under which age is attained in a tree, from those which produce it in an animal.

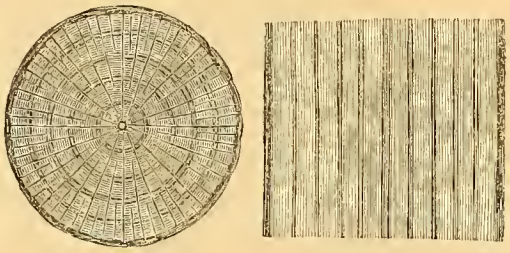
Plants are called annual, biennial, or perennial, as they endure for one, two, or more years. The difference depends on this, that the tissues of some plants are unable to resist the meteorological influences to which they are exposed so well as others. The reason of this difference in the tissues is not well made out. It is, however, well known, that a plant in this country may be an annual, on the Continent, a biennal, and, in the Tropics, a shrub, or tree. This is the case with the castor-oil plant, (*Ricinus communis.*)

In perennial plants, the tissues which resist climatal change carry on a kind of low vitality, as seen in the trunks of trees, in this country, in the winter. At more favourable periods, these tissues begin to grow in certain directions; buds, and leaves, and new tissues are formed, and deposited, in various parts of the plant, more especially covering the old, and growth or increase is the consequence. Even in plants not producing leaves, this process goes on, and, year after year, new tissues are added to the old. This is especially evident in sea-weeds, which thus exist through very long periods of time. Thus, Professor Schleiden says, "On the great fucus bank of Corvo and Flores, we might yet find, floating about, plants of *Sargassum*, which had been cut in strips by the hark of Columbus; and, in the northern drift, we might expect to discover Lichens, that had been

transported, with the soil in which they grew, from Scandinavia." Nor is this conjecture at all unreasonable, from what we know of the nature of the processes of growth in these plants; but we have no means, in cryptogamic plants, of accurately ascertaining the length of time they have been in growing. Nor is this possible in endogenous plants, or even in all exogens; but, in the latter, the stem presents, very generally, a series of zones, and each zone has been found to correspond with one period of vegetation. This period mostly represents a year, hence, by counting the number of zones in the trunk of an exogenous tree, we may form an estimate of the years it has existed. It is in this way that the age of many very old trees have been arrived at. The following list of old trees has been published by Moquin-Tandon, in his *Teratologie Vegetale*, and is reproduced in the English translation of *Schleiden's Principles of Scientific Botany*. There are known,



Sections of a Stem as it appears in May and June of the Fifth Year. The white spaces show the swelling cambium.



Sections of a Stem at the end of the Fifth Year. The envelopes and layers of liber are too thin to be shown by the pencil.

	Years.		Years.		Years.
Palms of . .	200, 300	Castanea (Chestnut)	360, 626	Quercus (Oak)	600, 800, 860, 1000
Cercis	300	Citrus (Lemon, Orange,		1600	
Cherodendron . . .	327	&c.) . .	400, 509, 640	Olea (Olive)	700, 1000, 2000
Ulmus (Elm) . . .	355	Platanus (Plane) . .	720	Taxus (Yew)	1214, 1466, 2588, 2880
Cupressus (Cypress) .	388	Cedrus (Cedar) .	200, 800	Schubertia (Taxodium)	3000, 4000
Hedera (Ivy) . .	448	Juglans (Walnut) . .	900	Leguminosæ . .	2052, 4104
Acer (Maple) . . .	516	Tilia (Lime)	364, 530, 800, 825, 1076	Adansonia (Baobab) .	6000
Larix (Larch) . .	263, 576	Abies (Spruce) . .	1200	Dracæna (Dragon Tree) .	6000

We might add considerably to this list, but it already supplies a sufficient number of illustrations of our general remarks.

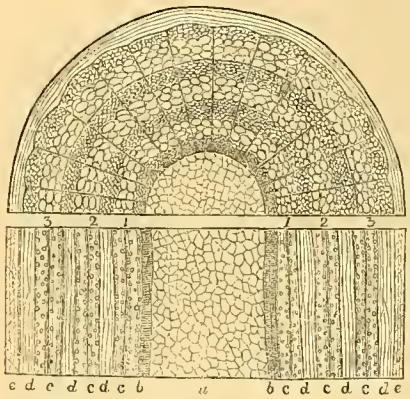
The means, by which the age of these trees has been ascertained, are two—first, from historical data, and second, from counting the zones. Thus, the colossal Dragon-tree of Oratava is known to have existed, in almost its present condition, in 1402; and, comparing it with the younger trees in its neighbourhood, its vast age is inferred. The Yew trees at Fountain's Abbey, in Yorkshire, are known to have sheltered the monks whilst the abbey was building. The abbey is now in ruins, but the trees retain their vigour; the lowest age that can be assigned them is twelve centuries; they are probably much more. But where trees have been cut down, the method of counting the zones has been had recourse to. There is no difficulty in this, where the tree is sound; but, in many instances, the older trees are, the more likely they are to be decayed in their centre. The plan then adopted is, to take a square inch, count the zones in it, multiply this number by the number of inches from the bark to the pith, which will then give the whole number of zones, and the age of the tree. This was the plan adopted by Adanson in calculating the age of the Baobabs of Africa, and which has also been employed in calculating the age of other gigantic trees. The numbers, however, thus obtained, can only be looked upon as approximations to the truth, seeing that the zones of wood vary very much in thickness, not only one with the other, but in parts of the same ring.

Size is no indication of the age of a tree, as various species grow at very different rates, and the same species, under different circumstances. The following table shows the different rates at which some common trees grow.

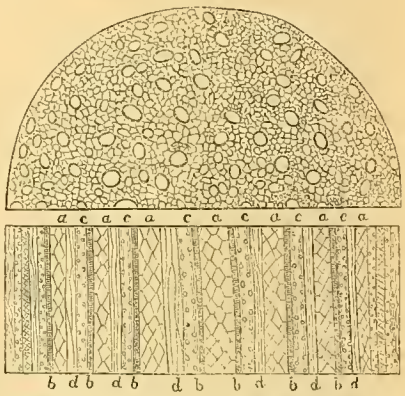
	First Year. Ft. In.	Second Year. Ft. In.	Third Year. Ft. In.		First Year. Ft. In.	Second Year. Ft. In.	Third Year. Ft. In.
Oak, circumference,	0 $10\frac{1}{2}$	0 $11\frac{1}{2}$	1 $0\frac{1}{2}$	Lombardy Poplar, circum.,	1 8	2 0	2 $3\frac{3}{4}$
Larch ,,	1 $0\frac{1}{2}$	1 3	1 4				
Elm ,,	2 $7\frac{1}{2}$	2 9	2 11	Lime ,,	1 $8\frac{1}{2}$	1 $10\frac{3}{4}$	2 0

Some trees attain an enormous size by their rapid growth. Species of *Eucalyptus* have been measured that reached a height of 250 feet, and measured 70 feet round their trunk.

The death of trees does not appear to arise from any natural period being assigned to the existence of their living tissues, or reproductive powers. When the tissues of a tree are very old they lose their vitality, especially in the centre of the trunks of the trees; and, on being exposed to the atmosphere, or moisture, they readily decay. The process of new growth is sometimes more rapid than this decay, and thus trees exist with enormous cavities in their interior. The time, however, comes, sooner or later, when a separation takes place between the roots and branches, and then the tree ceases to exist, although the tissue that has been conveyed away from it, in the form of slips and grafts, may still continue to flourish. Thus, the old stump of the Ribstone Pippin Apple is but struggling for life in Ribstone Park, while the slips from its branches adorn a thousand orchards, and supply the thousands upon thousands of bushels of Ribstone Pippin Apples that are annually consumed.



HORIZONTAL OR TRANSVERSE, AND PERPENDICULAR SECTION, OF THE STEM OF AN EXOGEN OF THREE YEARS' GROWTH. In the centre of each is seen the pith, *a*, composed of cellular tissue; surrounding it is the medullary sheath, *b*; and exterior to it are three rings of wood, each consisting of *c*, *c*, dotted ducts, and *d*, *d*, woody fibre. The last-formed is in contact with the bark, *e*, *e*, in which the layers are indistinct.—*Carpenter's Vegetable Physiology.*



HORIZONTAL AND VERTICAL SECTION OF THE STEM OF AN ENDOGEN, showing the bundles of ducts, woody fibre, and spiral vessels, irregularly disposed through the whole stem. *a*, *a*, portions of cellular tissue; *b*, *b*, spiral vessels; *c*, *c*, dotted ducts; *d*, *d*, woody fibre. The cellular portion of the skin, which in *Exogens* is separated by the first introduction of wood into pith and bark, here remains permanently intermingled with it.

[The accompanying engravings, representing Sections of Exogen and Endogen, will explain themselves. The number of zones in trees will probably give a tolerable approximation to the years of growth in temperate climates; but even here, two may be formed in one year, if any great check of the growth suddenly occurs during the Summer. In tropical climates the indication is far more doubtful; Adanson's computation, made in this way, carried the age of the Baobabs to from 5,000 to 6,000 years. It has been stated that monthly rings are formed in the tropics of South America (*Hopkins' Researches in Magnetism*). Some plants, such as the Cacti and Cycadeæ, require more than one year for the formation of a zone of wood.—A. H.]

THE CULTIVATION OF PRIZE PELARGONIUMS.

BY MR. JOHN PARKER, GARDENER TO J. H. OUGHTON, ESQ., ELM GROVE, ROEHAMPTON.

THE cultivation of prize Pelargoniums having been a favourite hobby of mine for some years, and my labours having been crowned with some little success, a few remarks on my mode of procedure may not be wholly without interest to some of the readers of the *Gardeners' Magazine of Botany*. I do not know that my system of culture differs very materially from that practised by others, but as it has always been attended with unfailing success, I am willing to hope that those who may follow my directions may not be less successful. The Pelargonium, or, as it is more generally termed, the Geranium, is a favourite plant with most people, being admirably adapted for decorative purposes, in the conservatory and drawing-room as well as at public exhibitions, while by providing a regular succession of plants, and preparing them properly, a supply of flowers may be obtained, and that with comparatively little trouble, throughout the year. My object, however, in this article, is to detail my system of management for exhibition; the subject of their growth, for general decorative purposes, more especially in the winter season, may probably form another paper.

To begin, however, at the beginning. The cuttings should be taken off when the wood has been tolerably ripened by exposure to full light and air, and being prepared, should be struck under the

[The above is a representation of the Pelargonium presented by Mr. Oughton, through the Royal Botanic Society, to the Queen.]

protection of a frame or hand glasses in the open ground, and in light rich sandy soil, giving little water for the first week or two, except a slight sprinkling on warm evenings, but exposing the plants to the dew throughout the night. When the cuttings are well rooted, which will be seen by their making robust growth, and short stiff foliage, they must be potted singly into pots suitable to their size and the state of their roots, using a compost of well enriched turfy loam, and thoroughly decomposed two-year-old cow dung, in equal proportions, with one-third peat, all sifted through a coarse sieve, and liberally intermixed with silver sand. In potting, take care to use plenty of drainage, covering it with rough pieces of turfy loam, as nothing is more injurious to the Pelargonium than stagnant water about the roots. When the plants are potted, place them in a cold frame, and keep them close in the day-time, until they are well rooted; but withdraw the sashes, and expose them on dewy nights. As soon as they are properly established, remove the sash altogether; and when they become inured to full air, remove them from the frame, and place them thinly upon boards, until the time arrives for housing them for the winter.

The time for placing Pelargoniums in their winter quarters, depends entirely upon circumstances. So long as the autumn is fine and mild, they are best out; but, at the same time, great care must be taken to have them securely housed before they become wet, or what gardeners sometimes term water-logged.

Too much water at the root during dull weather, and a cold stagnant atmosphere, is, in my opinion, the principal cause of the *spot*—a disease to which Pelargoniums are subject, and from which, when once attacked, it is difficult to recover them. Plants of Pelargoniums which once become stunted or unhealthy, may be considered as useless for the leading purposes of cultivation, and should never be used. A young, vigorous specimen, grown steadily from the cutting-pot, is the secret of a fine and permanent specimens. The plants being thoroughly established will require to be re-potted in November, using pots suitable to the size of the plants, and the same compost as before directed, with the exception of the peat-earth. If properly managed, the plants will require a second shift in February, and then each shoot should be stopped at the fourth joint, to induce them to produce lateral shoots; when these are sufficiently long, tie each out in a horizontal position, so as to lay a proper founda-

tion for the plant. When the lateral shoots are of sufficient length, they should be stopped a second time; and thus treated, they will form splendid foundations for large specimens in the following season, where such things are required for exhibition. Another way to prepare for large specimens is to take strong plants in April or May, and pot them into eleven-inch pots in rich compost, and place them, when the weather is sufficiently mild, in an open situation in the garden, keeping them clear of flowers throughout the season.

Plants that are intended to flower in May should not be stopped after they are cut down in July, as, if they are, they cannot be depended upon to produce their flowers in time, unless artificial means are used, which is always injurious to this class of plants. Specimens that are intended to flower in June, should be stopped the early part of January; and those which are required for July, in February. The successful cultivation of the Pelargonium depends much upon the winter treatment. Avoid, by all means, too much moisture and fire-heat and let the wood get firm before flowering, as upon this, combined with a pot well filled with vigorous, healthy roots, a fine head of bloom entirely depends.

My general time for cutting the specimens down is from the first week in July to the middle of August, keeping them rather dry for some time previously, and always taking care to expose the plants to the full sun, to ripen their wood for a fortnight or three weeks before doing so. The plants, so soon as they have made young shoots one inch long, are divested entirely of the old soil, the roots cut in a little, re-potted, using the compost before directed, and protected in a frame until they are thoroughly re-established, when they are exposed to full light and air until they are removed to their winter quarters. For blooming in May and June, I commence re-potting in November; and for July, in February—taking care to give plenty of drainage, and using at this potting well enriched turfy loam, with one-third thoroughly decomposed two-year-old cow dung, and plenty of silver sand. During the Winter the plants should not be watered, unless they require it, as may be readily told by giving the pot a sharp tap with the knuckles, when, if the soil is dry, it will ring quite clear; but, if wet, it will have a dull, heavy sound. When the plants begin to show flower-buds, liquid manure may be occasionally used. It is prepared by placing in a large tub of soft water half a barrow load each of cow, sheep, and horse dung, and one peck of lime, mixing all intimately together, and draining the clear liquid off by means of a tap placed a short distance from the top of the tub. To this liquid I add two-thirds of clean water, and I repeat the watering at intervals, five or six times, according to the state of the plants, when the flowers begin to expand. If the plants are required by a certain time, the assistance of a little fire heat may be necessary; lighting the fire early in the afternoon, so that the pipes or flue may become warm before closing for the night, when the fire may be allowed to go out. During the blooming season, great care must be taken to supply the plants plentifully with water, otherwise the foliage will soon become discoloured, and the bloom small and deformed.

Should the Aphis, or green fly, make its appearance, fumigation with tobacco is the best remedy—taking care that the plants are dry at the time of using it. In the management of the house—and Pelargoniums should always have one to themselves—too much air cannot be given,—of course, avoiding strong currents of cold wind; and for the purpose of admitting a free current among the foliage, the smaller and useless leaves and foliage should be occasionally thinned out during the winter months. When the plants are in bloom, a thin screen of canvas must be thrown over the house; and care must be taken to exclude bees as much as possible, as these industrious little insects, in extracting the honey, fertilize the flowers, and the purposes of nature (viz. the production of seed) being fulfilled, the flowers immediately drop.

Subjoined is a list of some of the most esteemed kinds, selected for their bright and distinct colours, large trusses abundantly produced, and free and good habit:—

A FEW SELECT PELARGONIUMS.

Alderman (Black).	Gipsy Bride (Foster).	Norah (Foster).	Rolla (Hoyle).
Alonzo (Foster).	Governor (Beck).	Orion (Foster).	Rosalind (Beck).
Ariel (Foster).	Gulielma (Beck).	Paragon (Foster).	Salamander (Gaines).
Armada, improved (Foster).	Lalla Rookh (Foster).	Pearl (Drury).	Satisfaction (Hoyle).
Belle of the Village (Hoyle).	Lord Gough (Hoyle).	Pet (Beck).	Sparkler (Hoyle).
Blanche (Beck).	Lord Stanley (Hoyle).	President (Hoyle).	Star (Beck).
Centurion (Beck).	Loveliness (Beck).	Pretender (Thurtell).	Superlative (Hoyle).
Christabell (Hoyle).	Meleager (Gaines).	Prince of Orange (Hoyle).	Vanguard (Beck).
Constance (Foster).	Mount Etna (Hoyle).	Princess (Beck).	Victory (Foster).
Crusader (Hoyle).	Negress (Cock).	Prometheus (Hoyle).	Virgin Queen (Arnold).

[This we regard as a very valuable communication, being the experience of a cultivator whose undeviating success entitles him to be considered one of the very best growers of Pelargoniums in the country.—*Cond.*]

THE ROOT-PRUNING OF WALL-FRUIT TREES.

By Mr. GEORGE SMITH, Brooklands' Nursery, Blackheath.

WHILE much has been written in various gardening periodicals, about root-pruning pyramidal pear-trees, its undoubted advantages, when applied to trained fruit-trees generally, have passed comparatively unnoticed. That there are not many gardeners who have tested the advantage of root-pruning wall-fruit trees, I would by no means assert; but I am strongly of opinion that, notwithstanding the sanguine exhortations of Rivers, Fleming, Errington, and other writers, the subject has not met with the general consideration of gardeners; for nothing is more common to be met with in the generality of gardens, than well-trained, healthy, and vigorous wall-trees, with scarcely a fruit-bud to be found upon them—excepting, of course, Peaches and Nectarines. And what other result can be expected? While every vestige of a shoot is lopped off twice or thrice during Summer, the roots are allowed full scope to extend themselves in a rich border, absorbing a profusion of crude sap, which gluts the branches, and bursts forth in the shape of excessively vigorous, and consequently, barren shoots. This mode of treatment, however, is continued year after year, until a mass of unsightly spurs are produced, when the trees are either cut back and regrafted, or they are grubbed up, to give place to a new set; and these, in a year or two after regrafting or planting, exhibit the same symptoms of excessive vigour and barrenness.

Very different is the case of the fruit-trees that are found growing in their natural forms in the market gardens skirting the suburbs of the metropolis, which afford a striking contrast to those trees which have had all the skill and care of the scientific pruner and trainer. While the former are literally studded with a mass of blossom-buds, the latter exhibit an aspect, the result of which proves far more pleasing to the eye than it does afterwards to the palate. In the former case, a balance is kept up between the branches and the roots; the roots have just sufficient power to absorb nutriment for the branches and leaves to elaborate for the formation of fruit-buds; while, in the latter case, every encouragement is given to them; they extend themselves in every direction, year after year, while the branches are limited to a given space. The trees, consequently, are kept in an unbalanced condition, and barrenness is the result. I am particularly desirous of drawing the attention of practical gardeners to the indispensable necessity for root-pruning all sorts of hardy fruit-trees which they find in a state of barrenness, for the purpose of bringing them into a fruitful condition, as I am convinced there are many enthusiastic cultivators of choice hardy fruits, who expend considerable sums in procuring a valuable collection of the best kinds, and in preparing soil of the best possible description; who, likewise, employ much time, and all their ingenuity, in training them in the most symmetrical forms, some upon the pyramidal principle, others upon walls, and as espalliers; who gaze, delighted, upon their luxuriant foliage, and vigorous branches, vainly hoping for a lucrative return for time and capital expended, but who are, nevertheless, adopting a system of treatment which is the direct cause of failure.

Now, if, instead of rigorously pruning the branches of young fruit-trees, they were allowed to attain the size desired, stopping, of course, their leaders, in order to produce the necessary quantity of side branches, and then were lifted entirely out of the ground and root-pruned, as their condition may seem to dictate, a profusion of blossoms would be produced with as much certainty as in dealing with a common Geranium. I am by no means an advocate for annual root-pruning fruit-trees, without regard to their condition; but, wherever barrenness, associated with healthy and vigorous branches, occur lifting and root-pruning may be safely resorted to, even with the largest trees, provided attention be given to mulching, and keeping the soil moist about their roots during the following summer.

The best plan, perhaps, would be, to make a point of lifting, or otherwise root-pruning a portion of the stock annually, as in severe cases of operation the trees may be thrown out of fruit-bearing for a season. As to the mode of operation, I may remark, that the circumstances of the case to be dealt with, will be the best criterion for the inexperienced operator, and to those who are not acquainted with the precise rate of growth that fruit-trees should be kept at, so as to establish a permanent condition of fruitfulness, the following remarks may be of service. Whenever a Peach or Nectarine tree makes more than from a foot to eighteen inches of wood throughout the tree in one season, it is too vigorous, and requires to be checked by root-pruning. Apples, Pears, Plums, and Apricots, when spur-pruned, ought never to be allowed to make more than from three to six inches of wood annually. By properly protecting the blossoms in spring, and duly thinning the fruit, trees may thus be kept in a suitable state of growth, and will continue to produce abundant crops of fruit until they become worn out, when they may be removed to give place to young ones.

NEW AND RARE PLANTS.

Pentarhaphia cubensis, *Decaisne.*—Cuban Pentarhaphia (*Journ. Hort. Soc.*, v. 86).—Nat. Ord., Gesneraceæ, § Gesnereæ.—A neat and pretty dwarf, shrubby plant, of compact habit, with obovate, dark-coloured evergreen leaves, crenated near the point. The flowers grow in the axils of the leaves, and are attached by

slender stalks an inch long; corolla about an inch long, tubular, curved, and of a rich scarlet; calyx of five, straight, narrow lobes, "not unlike five brown needles." It requires a cool stove, and remains a considerable time in bloom.—From Cuba; introduced in 1848. Flowers in summer. Messrs. Henderson, Pine-apple Place, Edgeware Road.

Berberis japonica, *Sprengel.* Japanese Berberry, (*Journ. Hort. Soc.*, v. 20).—Nat. Ord., Berberaceæ, § Berberideæ.—Syn., Mahonia japonica, *De Candolle;* Berberis Beallii, *Fortune.*—A noble evergreen shrub, the most gigantic of the berberries. The leaves are pinnate, nearly fifteen inches long, and of leathery texture, with four pairs of leaflets, and the terminal ones, which are five inches long, deeply cordate, with coarse spiny teeth on each side; the lateral leaflets slightly cordate, upwards of three inches long, with strong spiny teeth on each side, and a stiff triangular point.—From China, 150 miles north of Shanghae; introduced in 1849 by Mr. Fortune. Flowers not yet produced in England. Messrs. Standish and Noble, of Bagshot.

Berberis loxensis, *Bentham.* Loxa Berberry (*Journ. Hort. Soc.*, v. 7).—Nat. Ord., Berberaceæ § Berberideæ.—An evergreen shrub, the hardiness of which is uncertain. Its branches are furnished with small palmated spines, and very beautiful blunt obovate leaves, of a bright green colour, always tipped with a spine, and sometimes having spiny marginal teeth. The flowers are borne in erect panicled racemes, on a long peduncle quite clear of leaves; they are unusually small. From Peru: mountains near Loxa; introduced about 1846, by Mr. T. Lobb. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter.

Drymonia cristata, *Miquel.* Crested Drymonia.—Nat. Ord., Gesneraceæ, § Episcieæ.—Syn., D. sarmentulosa, *Lemaire.*—A pretty herbaceous stove perennial, with round fleshy rooting epiphytal stems, bearing large opposite oval lanceolate acuminate leaves, irregularly toothed, and attached by longish petioles. The flowers are axillary, on thickish peduncles; the calyx is large five-parted, with fringed segments; the corolla, consisting of a depressed campanulate tube, produced behind into an obtuse spur; the limb divided into five irregularly toothed lobes, dingy white, with faint purplish dotted lines down the centre, the upper portion of the throat bearing yellow glandular hairs.—From Dutch Guinea; introduced to Belgium in 1845. Flowers in summer and autumn.

Ophelia corymbosa, *Grisebach.* Corymbose Ophelia (*Bot. Mag. t.* 4489). Nat. Ord., Gentianaceæ § Gentianeæ.—Syn. Swertia corymbosa, *Wight.*—A greenhouse or half-hardy annual, growing a foot high, with four-angled stems, corymbosely branched in the upper part.

The leaves are opposite, obovate-spathulate. The flowers in terminal corymbs, pale purple, with a white eye; the corolla rotate, deeply cut into four spreading obovate veined segments.—From the Neilgherry Mountains; introduced in 1848, by Dr. Schmidt. Flowers in summer. Royal Botanic Gardens, Kew.

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Rhodostoma gardenioides.

RHODOSTOMA GARDENIOIDES.

Nat. Order, CINCHONACEÆ ♀ GARDENIDÆ,

GENERIC CHARACTER.—Rhodostoma, *Scheidweiler.*— *Calyx* with a somewhat cylindrical tube, two-bracteolate, adnate, the limb superior, persistent, five-toothed, teeth equal, acute, and recurved. *Corolla* superior, funnel-shaped, the tube long, cylindrical, glabrous within, the limb five-lobed, with lanceolate, slightly plaited, reflexed, mucronate lobes. *Stamens* five, inserted at the top of the tube of the corolla; *filaments* very short; *anthers* linear, included, fixed by the middle, sagittate at the base; *ovary* inferior, two-celled, covered by a fleshy disk; *ovules* solitary; *style* simple; *stigmas* two, linear. Fruit? (Endl., *Gen. Pl. Supp.*, iii. 74).

R. GARDENIOIDES, *Scheidweiler.*—Gardenia-like Rhodostoma.—Stem striate, shining; leaves opposite obovate-lanceolate, slightly acuminate above, attenuated into the short petiole, dark-green above, with the ribs prominent, pale beneath, shining; stipules minute, triangular, acute, and approximated in pairs over the base of the petiole; flowers in terminal and axillary leafy cymes; bracts and bracteoles small, ovate-lanceolate; calyx tubular, with a small five-toothed limb; corolla with a very long tube, expanding very gradually upward, much longer than the calyx; the limb short, five-toothed, reflexed; stamens almost simple, anthers long, just included; ovary surmounted by a fleshy disk; style filiform; stigmas two, linear.

SYNONYMY.—R. gardenioides, Scheidweiler, *in Otto and Dietrich. Allgem. Gartenzeitung.* x. 286.

DESCRIPTION.—Shrub. Stems erect, glabrous, rather shiny, finely ribbed, branching. Leaves opposite, obovate-lanceolate, acuminate, attenuated into the short petiole; upper side dark green, rather shining, veins prominent, under side paler, glabrous; stipules minute, acutely triangular, approaching in pairs over the petioles, persisting after the leaf has fallen. Cymes chiefly terminal, branches of cyme rather fleshy; bracts and bracteoles ovate-lanceolate, pale green, rather fleshy. Calyx superior, urceolate-tubular, five-toothed; corolla much longer, white, tubular, funnel-shaped, the tube five times as long as the reflexed limb; limb five-toothed, teeth mucronate, valvate in æstivation. Stamens arising near the summit of the tube, just included, filaments very short; anthers linear, attached about the middle, and prolonged downwards into a sagittate base. Ovary inferior, crowned by a fleshy disk, two-celled; style long, filiform; stigmas two, linear; ovules solitary.

HISTORY, &c.—The origin of this shrub appears to be unknown; it has, however, been grown in this country since 1845. It flowers both in the Winter months, and also throughout the Summer, but is not very showy, as the corollas soon drop off.—A. H.

The species appears to have reached this country from some of the continental gardens. Its first public appearance here, as far as we are aware, was at an exhibition of the Horticultural Society of London, in May 1846, when a plant in bloom was shown in the class of new plants, by Messrs. Veitch and Son, of Exeter. It is now rather frequent in collections, but is not held in very high estimation among cultivators.

CULTURE.—A stove shrub, never attaining a very ornamental character, partly in consequence of its excessively floriferous habit, by which the formation of a vigorous head of branches is prevented; and partly from the marcescent character of the flowers themselves. Our plate represents it at its best. The plants should be grown in a compost of three parts peat earth to one of good mellow loam, made rather sandy; and they must not be over-potted. When small, the developement of flowers should be entirely prevented, in order that a good growth of branches may be secured.

The Rhodostoma is propagated very freely by cuttings in sand plunged in gentle bottom-heat. It will be found a useful flower for bouquets. If large specimens are wanted, the young plants must not be permitted to produce any flowers until they have attained considerable size. Planted in a warm conservatory border, or encouraged in the stove by a slight bottom-heat, this plant will be found useful for cutting, as the delicious scent of the flowers makes up, in some measure, for their very ephemeral character.

Though by no means a showy plant, in consequence of the defective characteristics which have been mentioned, it is worth growing for winter bouquets; for which its very free flowering habit, and its much-branched mode of growth,—admitting of many sprigs being cut from a moderate-sized plant,—render it very suitable.—M.

RAMBLES AMONG WILD-FLOWERS.

"Gather the rose-buds while ye may,
Old Time is still a-flying;
And the same flower that smiles to-day,
To-morrow may be dying."

THUS sung Herrick, one of the most charming of our lyric poets; and with him we say, "gather the flowers while we may," lest we resemble the blind man in Goethé's *Werter*, who, wandering about in the depth of Winter, complained that he could find no blossoms. Truly there is an appointed season for the birth, and death, and regeneration of all that lives,—aye, even of the most ephemeral. The earth is redolent of vitality; and scarcely have the winter snows melted into the soil, when

"Each flower and herb on earth's dark breast,
Awakes from the dream of its wintry rest!"

And now the lover of Nature may go forth on his rambles, and almost listen, as poor Keats imagined, to the young buds leaping into life, not forgetting—for a vein of philosophy will mingle with the reflections of all sound naturalists—that this universal regeneration is but a type of human destiny. Well, too, may he exclaim, with a healthful, joyous feeling of exultation,—

"How beautiful is all this visible world!
How glorious in its action and itself!"

And IS IT NOT beautiful? Accompany us, kind reader, where you will, along the pathway of the open meadow, down among the shadows of the copse, through which the village stream winds, murmuring and half hid, and we shall find a silent beauty impressed on all that we behold. Nay, even in these early days of the young year, some Wild-flowers are found to tempt our walk; yet, for the most part, the commencement of February has so few charms for the botanist, that he has little inclination to leave his warm abode, and, with Fletcher, he rather says:—

"Give me
Leave to enjoy myself. That place that does
Contain my books—the best companions—is
To me a glorious court, where lonely I
Converse with the old sages and philosophers."

But still, if he will venture out, he finds much that will repay him. On the chalky soils of England, and in woods and thickets that are well sheltered, he will find our indigenous Hellebore; and if he be a classic, he will remember that the ancients often made use of it, not only to cure disorders of the mind, but to give strength and vigour to the imagination. Valerius Maximus tells us that Carneades, the philosopher, when he was engaged in a dispute with Chrysippus, always prepared himself with a dose of it, and "that the success of it was such, as made all who were desirous of solid praise follow the example." If he be wise, however, he will take none of it. As the "Christmas Rose," the Hellebore is more dear to us:

Triumphant over Winter's power
It cheers our hopeful sight,
'Midst chilling snows, with blossoms fair
Of pure and spotless white.

About the end of February, we may expect to find the Marsh Marigold (*Caltha palustris*) ornamenting, with its fine yellow blossom, the open marshes, and the sides of muddy streams. It is not abundantly in bloom, however, until somewhat late in the Spring; and in the low grounds of Lapland and Sweden, where large tracts of land are coloured with its flowers, it is seldom in perfection before May. Its blossoms, if boiled in alum-water, are said to give a good dye to paper. As food for cattle it is rarely taken, unless when other herbage is not obtainable, since it partakes of the acrid properties of its allies, the Ranunculus family.

Growing under the low brushwood amid decaying remains of last year's foliage, the devout admirer of Flora, now and then, may find the modest Chickweed (*Stellaria media*) sending forth a trifling tribute to the garland which may be made at this early season of the year; to which also the Groundsel (*Senecio vulgaris*) and the Colt's-foot (*Tussilago farfara*) lend their feeble and unassuming aid. The Dandelion, too, (*Leontodon Taraxacum*,) with bolder aspect, gives all the assistance in its power to make the road-sides and waste lands, so lately snow-clad, look cheerful, reminding us of coming Summer. These last two plants are of much higher importance than any one would imagine, from their lowly growth and weed-like appearance. The first furnishes a useful remedy for coughs; while the second, in the physician's hands, is often very beneficially employed.

But let us wend our way to the heath land; and there, perhaps, we may meet with some plants of the small dwarf or winter Furze. It is common enough; but when it is found at this season of the year, we may rely on our search being rewarded; its orange blossoms seem to defy equally the bleak winds and nipping frosts of the autumnal and winter months, and rarely going out of bloom before the end of January. The unpractised eye might easily confound this species (*Ulex nanus*) with the common Furze or Gorse (*Ulex europæus*), which is in blossom from Spring to the end of Summer; and hence poets, who are not also botanists, have regarded the plants as identical, and sung them as "the never-bloomless Furze."

And then the Violet—the shade-affecting Violet—which poets sing, and all men love; if Favonius invites, we shall find it with its deep-blue eyes,

> So sweetly smiling from its lowly bed,
> Like a young heart in full confidingness,
> Whose every hope is tinged with gold,
> And heavenly azure seems to mould
> Into the hue of constancy.

Nay, we may soon gather Wild-flowers enough to fill our vasculum, and more than will suffice to fill our thoughts. The Mezereon "breathes mild its early sweets." The dead Nettles (*Lamium*) are found beneath the southern hedges. The Snowdrop (*Galanthus nivalis*), with its wand-like stem, is in bloom. Several Ranunculi are now in flower. The Hazel (*Corylus Avellana*) unfolds its male blossoms. The flowers of the Holly (*Ilex Aquifolium*) begin to open. The leaves of the Honeysuckle (*Lonicera Periclymenum*),

> "which loves to crawl
> Up the low crag and ruin'd wall."

are quite out. The Periwinkles (*Vinca*) smile upon us from their lowly bed. The Daisy (*Bellis perennis*), the "wee crimson tippit flower," the "poet's darling," greets us everywhere. The Willow (*Salix*) "shows its downy powdered flowers." The Elder Tree (*Sambucus nigra*) has, in some warm hedge-rows, put forth its flower-buds; and if the season be early, we may also find the Alder (*Alnus glutinosa*) and the Aspen (*Populus tremula*). By the way, the Highlanders entertain a superstitious notion that our Saviour's cross was made of this tree, and, for that reason, they suppose its leaves can never rest.

These are, however, but a tithe of the Wild-flowers the piercing eye of the devout botanist may find towards the end of February, and in the beginning of March; and the list will be materially affected, according to the season. But still these are enough to be suggestive of much sweet thought and to call forth feelings of tenderness, which "often lie too deep for tears." We need not appeal to the floral language of the East; for does not every village maid attach a meaning to each flower she gives or takes? When the unhappy Ophelia, thinking herself forsaken, becomes insane, Shakespeare, with that exquisite and consummate delicacy of feeling with which he has delineated the minutest feature of every character he has drawn,—even in a state of aberration,—represents her poor distracted thoughts, dwelling upon melancholy associations connected with flowers. Yes! who can dwell upon Pansies or Violets without remembering the outpourings of poor Ophelia's bewildered mind, lighting up, with gleams of wild and transitory fancies, the ruins of her broken heart? And, we may fairly ask, was it not intended, and is it not, perhaps, the final cause of objects being so perfectly formed,—so invested with loveliness, and so agreeable to our sight,—that they should be suggestive of associations which elevate the mind and refine the feelings?

But it is not merely the fragrance and the beauty of Wild-flowers which endear them to us, as we observe them in our walk, peeping out from underneath the shadow of the Hawthorn hedge. They have their uses and appliances to relieve the wants and sufferings of humanity. To these we may, if acceptable to our readers, at some future time allude, for they possess the power to cure, and from them may be extracted potions to calm or excite the troubled and distracted spirit. And, availing himself of this fact, Coleridge, in his wild and beautiful tale of *Christabel*, makes the "lovely lady" minister to the mysterious damsel she met by moonlight in the forest,—after she had prayed beneath the old Oak tree, and conducted her to her father's hall,—the Wild-flower wine which restores her prostrate frame—

> "O weary Lady Geraldine,
> I pray you drink this cordial wine!
> It is a wine of virtuous powers;
> My mother made it of Wild-flowers."

But we must stop. Reader, it is the associations, whether philosophic or poetic, we carry with us, which throw a charm around these solitary rambles, in the course of which every well constituted

and enlighted mind derives pleasure, from outward contemplation and inward reflection; and learns, in the midst of its admiration,

> "To look on Nature with a humble heart,
> Self-questioned where it does not understand,
> And with a superstitious eye of love."

A PLEA FOR PYRAMIDAL PELARGONIUMS.

By Mr. GEORGE M'EWEN, Gardener to the Duke of Norfolk.

PRESUMING that we shall have gained an important point, if we can satisfy our readers that the form of training which we recommend is worthy of imitation, we deem it expedient, before entering upon the practicability of the subject, to show that variety of form is desirable; not that we wish, or expect, to see the present dwarf form abandoned. No; but only that another form, viz., the pyramidal should be introduced. We are prepared to show that it is not less natural, practicable, nor is it less appropriate, than the dwarf, squat form; and that it will much increase the beauty and interest of a collection of these plants as a whole, and would add largely to the number of admirers and growers of the Pelargonium, if this form of growth were to be generally introduced.

Because of the delight which *variety* of form produces, pyramidal training is desirable. Who is not fond of variety? Let us go and look upon yon forest—scan the fields—glance at the wild-flowers and plants by the highways and byways—take a grand survey of the vegetable creation;—or, if you choose, let us confine our range, and take the same species or varieties, and have them each shorn of their now varied forms, and then say if they have not lost more than half their beauty and interest by the change. Now, all we plead for is, that we should not pay exclusive attention to one—the dwarf—form; but that we should grow the tall form also.

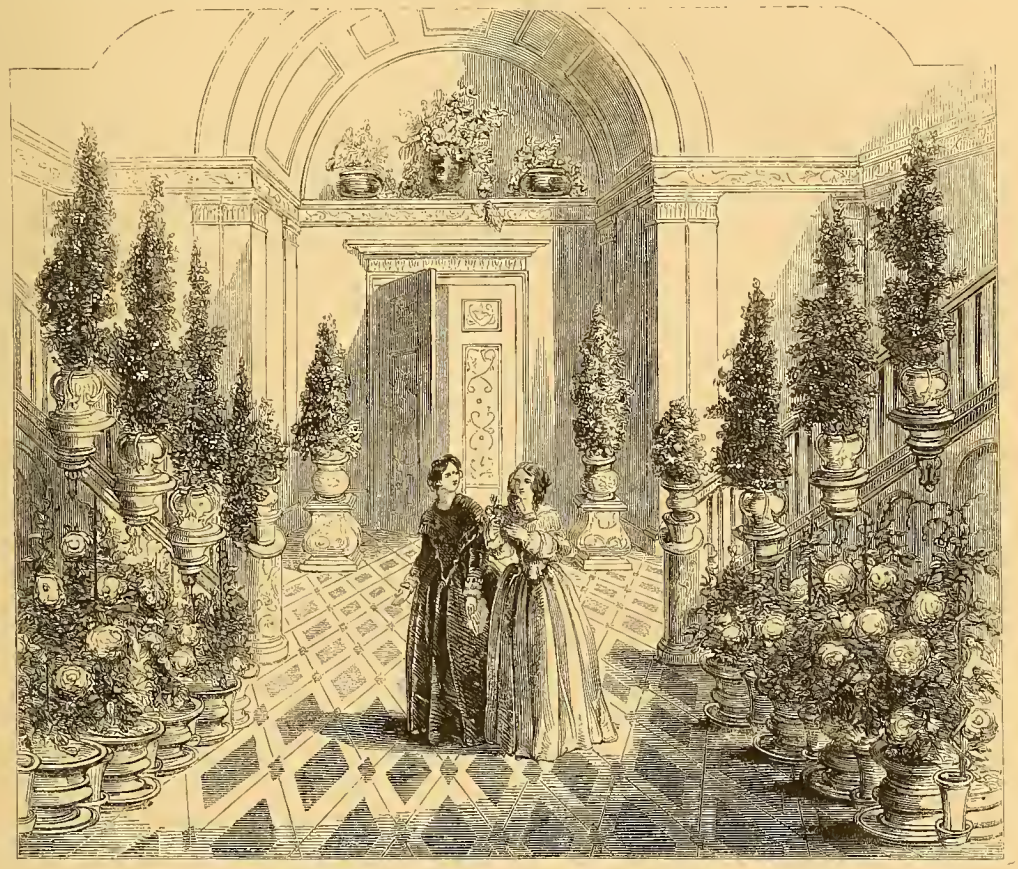
Another inducement we would urge in favour of the pyramidal training, is *novelty*. To tell gardeners that anything *new* gives increase of interest, and oft-times pleasurable excitement, is to repeat what they must have constantly observed. Indeed, much of the success of gardening may be traced to, if it does not altogether, depend upon thus giving an agreeable excitement.

Another and yet more important inducement, we would urge, is their utility, or adaptation to almost any situation. Yes; you can place them with *effect*, whether in or out of bloom, on the centre, or side stages, where the sun, light, and air, may play freely upon them; or you can lodge them on circular hoops of iron or brackets, in a hall or staircase, as represented in the woodcut. How much, too, would they enliven the tameness of the Pelargonium house as it is; or, where they are still more at home—yet greater favourites—in those large conservatories, where you can walk past, and around them, and feel as if in a garden. Again; decorative objects are perchance wanted for special occasions—none will be found so suitable as the pyramids for centre-pins in the group of flower-stands, or baskets; whilst as pillars in the entrance-hall, or by the corridor, or as beautiful plants for the table, they are equally appropriate.

Again; they will "fit in" to any style of gardening, whether geometrical or gardenesque; in rows by the straight walk—singly on the smooth lawn and in the dressed border at intervals, or as a centre plant in the mass of colour;—by turns relieving, surprising, and always greatly pleasing. And who can doubt, that, in the time coming,—when a yet higher standard, and a purer taste, is exemplified in the arrangements of our exhibitions,—our pyramidal-formed plants will be there, and so managed as to bear a thorough inspection—when no stakes nor glaring artificial props need be theirs—while the admitted dull uniformity of the collections in the Geranium tents will have passed away, to be no longer tolerated.

If we have done justice to our subject, we have succeeded in showing that our pyramidal Pelargo-

niums are, or may be, objects of great beauty and interest, as well as great novelty and utility, and will largely compensate for the labour bestowed on them; we now proceed, therefore, to treat on the not least important part—the *practicability*—of the subject.



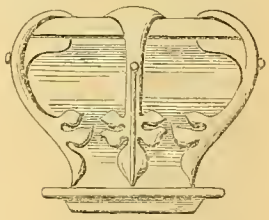
STAIRCASE AND HALL, WITH GERANIUMS IN VASES AND ON BRACKETS.

Methinks I hear some one argue that the strength of the plant will be sure to go to its top, leaving the bottom and body of the plant naked. Another says that it will be *so long* before a Geranium is grown to the height and girth you require (say six feet by three—not more). And another won't think of it, because they occupy so much room. To the first objection it is replied, that the tendencies spoken of can be successfully counteracted, on the same principle that we train our wall-trees wheresoever we will. To the second, we submit that one season is not long; and, when once the plant is trained, it lasts for years. And to the third objection we reply, that the stage-room required is not more than that occupied at present, the extra height requisite being now unoccupied. It may, however, be well to remark here, that it is necessary to have in "the mind's eye" the model at which to aim in producing. We suggest that the height of the plant should be twice its diameter; that is, if the breadth of the plant at the base (which shall be just at the rim of the pot) is three feet, the height may be six feet, or thereabout. We must also remark, that in ordinary circumstances this height should not be exceeded; for this reason, amongst others which could be adduced:—in this class of plants the flowers are so placed as to display themselves better when looked upon, than when looked up to; and, for a similar reason, there should be no swell on the body of the plant. With such plants as the Rose, Fuchsia, Scarlet Geranium, Heliotrope, &c., there need be no limit to the height, if due proportions are maintained. In a future paper we may give a few suggestions on the *fitness* and adaptability of these subjects for pyramidal training.

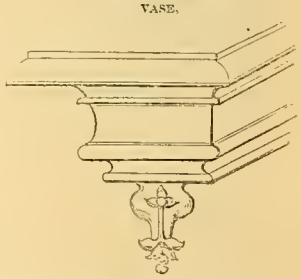
[We append to the above very suggestive remarks some notes on the same subject, showing the effect of pyramidal plants as ornaments to the hall and staircase; with the accompanying practically

illustrative sketches, which are furnished by Mr. H. Noel Humphreys:—"When last in Paris," writes Mr. Humphreys, "I was much struck with a beautiful effect produced by plants placed outside the rich iron balustrade of a principal staircase, at the hotel of the Count Auguste de B———. In that instance, the pots containing the plants were lodged in circular loops of iron, connected by a strong bar fixed firmly to the exterior of the staircase, at and between each loop. By this inexpensive means the odour, the freshness, and the floral beauty of the plants accompanied the visitor to the very door of the principal saloon, without encumbering the staircase, or encroaching in any way on the space devoted to free ingress and egress, which is seldom, in modern buildings, sufficiently spacious to bear curtailment. Geraniums grown in the pyramidal form would be peculiarly suited to place in such a situation, as their height would bring them above the balustrade, and leave their best flowering portion to the unimpeded view of the visitor, while a plant grown in a lower form would not possess this advantage. But instead of the iron loops, which can only be regarded as a cheap temporary contrivance, I would suggest a more decorative, and at the same time more permanent mode of placing flowering plants outside the balustrade of a staircase, and, at the same time, one which might be made subservient to other purposes. I propose making the principal moulding beneath the exterior of the balustrade jut out at certain distances, and by describing three-fourths of a projecting circle, form a series of brackets, upon which ornamental vases containing plants might be placed. Thus, on other occasions, when a profusion of light might be more desirable than flowers, bronze candelabra, each surmounted by a single light, with a ground glass globe, might be substituted for the vases containing flowers, or they might alternate with them, which would produce a very rich and pleasing effect. In the accompanying sketch I have shown the Geraniums placed upon the circular brackets as described, and, in the hall beneath, I have arranged a row of vases, exactly beneath the Geraniums, which I suppose to contain finely-formed Hydrangeas, grown with a single stem like the Geraniums, but with bushy round tops, in the orange-tree form, to contrast with the pyramidal figure of the plants above. Between each Hydrangea I would place a climbing-plant, neatly trained to a tall rod; they might be Maurandya Barclayana, Thunbergias, or Loasa lateritia; but they should be all the same, and very trimly trained, as this *symmetrical repetition* is necessary wherever irregular forms have to be grouped with architecture."

PEDESTAL.



VASE.



BRACKET.

In a future paper the management of pyramidal Pelargoniums will be explained; and accompanied by Illustrations of their application to Garden Terraces, with some practical suggestions by Mr. Humphreys.]

Review.

A Packet of Seeds saved by an Old Gardener. London: Chapman & Hall, 1850; pp. 48.

This is a strange title for a very odd book, written in a quaint style, and purporting to be a history of the vicissitudes of the son of a drunken parent, whose chequered progress as a gardener is depicted from the time of his leaving his father's house, and travelling in a road waggon to his first situation, where he had to sleep in a stoke hole, compared with which his master's "sporting dogs' kennel was a beauty;" to the time of his coming to see one of the great Horticultural Fêtes at Chiswick, and, by his unsophisticated manners and countryfied appearance, stealing a march upon the benevolence of the learned secretary of the Horticultural Society. In the narrative of his successes and misfortunes, Gregory, in his homely way, deals out some advice by which both masters and men may profit; indeed, in his preliminary address he says, "I've tossed the caps down, let every master and man wear the one that fits him." In the progress of the work cuffs are dealt out with an unsparing hand to masters and men; servants of all denominations; tradesmen;

"Church of England ministers," and methodists; governesses, and ladies' maids; coachmen and grooms. In fact those who have escaped a "rough rub" or a "hard hit" may attribute it evidently more to forgetfulness on the part of the author, than to any desire or intention to allow them to go unscathed. Gregory in his way is quite a Sir Oracle, and the only wonder is, that a man so shrewd from infancy should have met with so many rebuffs in his progress through life. To look at him, however, phrenologically: though shrewd, he was evidently a man of small intellect, and smaller professional attainments who trusted more to his cunning than to his courage or ability to get him through difficulties, who had little or no self-respect properly so called, and who, having to serve, would have cringed to anything to curry favour from his superiors.

Now, although circumstances placed this man in a gardener's situation, it is quite certain that he was not worthy of the name of a gardener; but was in reality one of those handy men—and far be it from our intention to disparage them—who, when docile, make excellent gardening machines, but who have no more a right to be called gardeners than our friend of W—— Cottage, Isleworth, has to place the origin of the "Packet of Seeds" upon the shoulders of James Gregory.

We are aware that this work has been highly spoken of by some of our contemporaries; and, though we admit that it contains a deal of advice by which gardeners, both old and young, as well as their employers, and many more, may profit; yet, looking to its tendency and influence upon gardeners and gardening, we believe it to be injurious, and calculated to degrade gardeners in the eyes of their employers and the world. That the author should write of gardeners within the sphere of his own observation and experience, which had been principally confined to that class of handy men who make themselves generally useful, is not to be wondered at; but if he would place them upon an equality with such men as Paxton, Fleming, M'Intosh, Barron at Elvaston, Spencer, and many more equally respectable and talented, though less fortunate men, we must enter our protest at once against such an assumption. We have no wish to raise gardeners to a false position, or to become the advocate of egotists and pretenders, but at the same time we must protest against men of education, moral worth, and professional ability being associated with the hero of this tale, according to whom, gardeners must have no opinion of their own, but must be the willing tools of whoever may think fit to employ them. The old gardener, in the course of his servitude, is elevated from the plain name of "James" or "Gregory," to "Mr. Gregory," which immediately turns his brain, and like other ignorant men, he begins to give himself airs, "or take on," as he terms it. "If the squire gave me any orders, I did not take 'em as I ought to have done. If he had a plan, I had a plan; if he wanted anything done, I was just going to do it, *only* something or other;" and then I was often saying, at such times—"I'm sure I'm always at work; I do the best I can," and the like, the upshot of which is, he is discharged, takes a house in the village, becomes a job-gardener, at 2*s.* per day; and, ultimately, through sickness in his family, is very much distressed. At this juncture, through the intervention of the governess, he is restored to his old situation, his successor and predecessor, "a very respectable young man, and come from a good place," having been dismissed, because he had the misfortune to marry "a fine-looking young woman, who had been brought up to the dressmaking; whose mother, like a foolish woman, instead of teaching her how to clean a house, cook, and so on, and getting her into a respectable family, had said her daughter should never be a slave, and gave her too much her own way," and who, consequently, neglected to clean the garden-room, and gave offence to the master and mistress. Well, shortly after the old gardener is reinstated, the master salutes him with—

"Is that you, Gregory?"

"Yes, sir," said I, "and very much obliged to you I am for all favours."

"You will have nothing to thank me for," said he, "if you do what I wish; and if I tell you to cut off half the trees' heads in the orchard, I'll have it done, though I'll hear all you've got to say against it, and I'll not blame you if I do wrong. If you gardeners don't take care you'll sicken half the masters in the country, and they'll employ labourers instead, for I'd rather plough my place up than have a man in my service that thinks himself too great to do what he's told, and when he's told. If I want my land cropped to my fancy, do you think my bailiff is to do as he pleases? No; he's too much good sense for that; but half of you gardeners must'nt be interfered with; and that makes gentlemen care so little about changing a gardener."

Here is a correct likeness, we are sorry to say, of a class of gentlemen, some of whom know a little of gardening, as other gentlemen magistrates know a little of law; but so little, that they would act wisely to let a good gardener pursue his own course, just the same as the magistrate permits his decisions to be guided by the advice of his law-clerk. We are speaking now of gardeners properly so-called, and not of handy men, or garden labourers. We do not dispute a gentleman's right to do as he likes with his own; and, at the same time, it is but right that he should hear his gardener's reasons for objecting to his plans, and then, in case of failure, exonerate him from blame. We once remember hearing a nobleman's gardener say, that if "his Grace" told him to turn a dozen donkeys into the pleasure-grounds he should do so; previously pointing out the injury they would do, to clear himself from blame; and so every gardener ought to do, viz., state the reasons for his opposition to his master's plans fully; and then, if his master persists, do the best to give the plans fair play. In dismissing the "Packet of Seeds" from our table, we are sorry our Isleworth friend did not aim at higher game, and have endeavoured to elevate rather than to disparage the character of his brother exhibitors; for, in speaking of the "Jack Braggs" of the breakfast-room at Chiswick, he is aware that the majority are mere helpers and hangers on, and that those who make the most noise have frequently the least to talk about. As far as we know, and we have had as much experience in these matters as the author, gardeners are well conducted, civil, and courteous, indeed, much more so than we have seen their superiors in station under similar circumstances. Therefore, the allusion was uncalled for, and, to say the least, in very bad taste.—A.

NEW AND RARE PLANTS.

Berberis undulata, *Lindley*. Wavy Berberry (*Journ. Hort. Soc.*, v. 7).—Nat. Ord., Berberaceæ § Berberideæ.—An evergreen rigid shrub, from four to six feet high, said to be quite hardy. The branches have long three- or five-parted spines; and thick, undulated, oblong-lanceolate leaves, growing in fascicles, and furnished with a few distant spiny teeth. The flowers grow in small, roundish, nearly sessile racemes, scarcely so long as the leaves.—From Peru: near the village of Andagles, at an elevation of 12,000 feet. Introduced in 1846, by Mr. T. Lobb. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter.

Tropæolum Smithii, *De Candolle*. Smith's Indian Cress., (*Bot. Mag.*, t. 4385).—Nat. Ord., Tropæolaceæ, § Tropæoleæ.—Syn., T. peregrinum, *Linnæus*.—A very pretty climbing annual, with the habit of T. aduncum,

to which it forms an admirable contrast. It has twining succulent stems, bearing smooth, dark green, five-lobed peltate leaves. The flowers grow singly from the axils of the leaves, attached by long, slender, twisted petioles; the calyx is dull red; the cuneate fringed petals, orange, veined with red — From Columbia: mountains of 9000 feet elevation; introduced in 1847, by Mr. W. Lobb. Flowers in summer. Messrs. Veitch and Son, of Exeter.

Clerodendron bethuneanum, *Lowe*. Capt. Bethune's Clerodendron, (*Bot. Mag.*, *t.* 4485).—Nat. Ord., Verbenaceæ.—A magnificent stove shrub, smooth, growing five feet or more in height; the stems obtusely four-angled. The leaves are very large, cordate acuminulate, and of soft texture. The flowers grow in large lax terminal panicles, the peduncles, pedicels, bracts, calyx, corolla, and long stamens, all of the deepest crimson; the calyx large inflated; the corolla with a slender tube, and an oblique limb of three spreading oblong lobes, the larger upper lobe having a large white spot at its base, the lateral ones with a smaller dense spot of purple.—From Borneo: banks of the Sarawak River; introduced in 1847. Flowers in summer and autumn. Mr. Low, of Clapton.

Epidendrum ornatum, *Lemaire*. Ornate Epidendrum.—Nat. Ord., Orchidaceæ § Epidendreæ-Læliadæ.—A pretty stove epiphyte, without pseudo-bulbs, but having numerous erect stems, a foot high. The leaves are distichous, lanceolate, or linear-oblong acuminate, tinged with violet, especially the veins. The flowers grow in drooping nearly simple racemes from the summit of the stems; the corolla fleshy, warty on the outside, the sepals and petals reflexed, green, the lip white, marked with a beautifully striate bright red spot. From St. Thomas; introduced to Belgium about 1848. Flowers —— ? M. Van Houtte, of Ghent.

Echites peltata, *Velloza*. Peltate-leaved Echites.—Nat. Ord., Apocynaceæ § Wrighteæ.—A beautiful perennial stove-twiner of vigorous habit, with a thickish fleshy stem, covered with velvety down. The leaves are large, opposite, broadly ovate-acuminate, peltate, and cuspidate at the base. The flowers grow six or eight together, in compact corymbose umbels; the corolla funnel-shaped, furrowed, two to three inches long, abruptly contracted below the middle, where it swells gradually into the limb of four irregularly-reflexed, ovate-acuminate lobes; the flowers are rich yellow on the inner surface, paler on the outside. From Brazil; introduced to Belgium in 1844. Flowers in summer.

Dendrobium palpebræ, *Lindley*. Eye-lashed Dendrobium. (*Journ. Hort. Soc.* v., 33).—Nat. Ord., Orchidaceæ, § Malaxeæ-Dendrobideæ.—A handsome stove epiphyte, with erect, club-shaped, tetragonal stems, bearing at top acutely oblong, lance-shaped, leathery leaves. The flowers grow in loose, lateral racemes, and are white, with a deep yellow stain at the base of the lip; the sepals are spreading, oblong-acute; the petals obtuse and denticulate; the lip ovate, obtuse, cucullate, covered with soft down, and fringed, near the base, with long hairs like eye-lashes.—From Moulmein; introduced about 1848. Flowers in autumn. Messrs. Veitch and Son, of Exeter.

Valoradia plumbaginoides, *Boissier*. Leadwort-like Valoradia. (*Bot. Mag.*, *t.* 4487).—Nat. Ord., Plumbaginaceæ.—Syn., Ceratostigma plumbaginoides, *Bunge;* Plumbago Larpentæ, *Lindley*.—A half-hardy, perennial herbaceous plant, growing from a foot to a foot and a half high, with numerous flexuose branches, forming a dense mass. The leaves are alternate, obovate, ciliated. The flowers grow in axillary or terminal heads; the bracts scariose, tinged with red; the corolla hypocrateriform, with a slender tube, and a regular spreading limb of five heart-shaped, bright blue lobes, paler at the back, and of flimsy texture.—From China: Pekin and Shanghae; introduced by Sir G. Larpent in 1847. Flowers in autumn. Messrs. Knight and Perry, of Chelsea.

1. Chorozema flava. 2. Chorozema triangulare.

CHOROZEMA FLAVA.

Nat. Order, Leguminosæ ‡ Papilionaceæ.

Generic Character.—Chorozema, *Labill.*—*Calyx* half five-toothed, two-lipped, upper lip bifid, lower three-parted. *Corolla* with the inflated keel shorter than the wings. *Style* short, hooked. *Stigma* oblique, obtuse. *Legume* inflated, one-celled, many-seeded, sessile, or sub-sessile. (*Decandolle, Prodromus.*)

Chorozema flava.—Yellow-flowered Chorozema.—Leaves elongate-ovate, the margins sinuately toothed, the teeth and apex armed with slender spines, shiny above, reticulate beneath; bracteoles about the middle of the pedicels; standard of the corolla deep yellow, wings and keel lemon-coloured.

DESCRIPTION.—A low evergreen shrub of a loose graceful habit. Stems slender, and with the pedicels and calyces sparingly covered with short hairs. Leaves from one to two inches long, elongate-ovate, shining above, opaque beneath, with the reticulated veins very distinct, the margins excavated by small shallow round sinuses, with acute spinous teeth between them, bearing some resemblance to the holly leaf. Flowers in terminal and axillary open leafy racemes; pedicels arising in the axils of bracts, and with a pair of minute bracts halfway up. Calyx five-toothed and two-lipped. Corolla with the standard large, transversely expanded and emarginate, deep yellow with green veins at the base; wings lemon-yellow, longer than the keel; keel inflated, enclosing the stamens and short-hooked style. Legume ?——

History.—This elegant little plant is, like its congeners, a native of New South Wales; its history is unknown, excepting that it was introduced by Baron Hugel, we believe, to Kew. Our figure is from a plant in the greenhouse of Messrs. Henderson of the Wellington Nursery, St. John's Wood, who inform us that it is a very freely blooming plant, flowering all through the summer. Its delicate habit and shiny leaves give it a very graceful character, and although the flowers are less showy than those of some other species, the freedom with which it produces them renders it a desirable greenhouse plant.

The name of the genus is derived from *choros*, a dance, and *zema*, drink; Labillardière having named it in celebration of the discovery of a fresh water spring, while travelling on the west coast of New Holland.—A. H.

CHOROZEMA TRIANGULARIS.

Chorozema triangularis, *Lindley*.—Triangular Chorozema.—Leaves sub-hastate, pinnatifid, spinous; the point entire, longer than the teeth; bracteoles at the summit of the pedicels.—*Lindl., Bot. Reg.* t. 1513; *Paxton's Mag. Bot.* xiii. p. 73.

DESCRIPTION.—A low, slender, evergreen shrub, with sub-hastate, pinnatifid, spinous-pointed leaves. The racemes axillary and terminal, leafy; bracteoles at the summit of the pedicels. The standard of the corolla scarlet, with a yellow patch at the base; wings purple. Its habit is closer than that of most of the genus.—A. H.

History.—Introduced into this country in 1830, from New Holland, where it was discovered by Baxter. Our drawing was made from a plant in the Brookland's Nursery.

Culture.—Among the additions lately made to our collections of hard-wooded plants, Chorozema flava is one of the most distinct and beautiful. It promises to be of free growth, and flowering throughout the season, will be found useful for conservatory decoration. Being, however, of loose habit, it will require considerable stopping and pinching back to induce it to form a bushy and compact specimen; and until the plant attains considerable size, it will be advisable to remove the flower spikes directly they are produced. Chorozemas delight in rich turfy peat, with a little fibrous loam and leaf mould, liberally intermixed with gritty sand, and potsherds broken small. If the plants are strong and well rooted, give them a liberal shift, breaking the soil rather fine, and depending more for mechanical action upon the composition and mixture of the soils, than upon large pieces of turf and peat; for though these may act advantageously for a time, the sand is soon washed away, and the composition becomes sour and unhealthy. After the plants are potted, place them in a close pit or a warm part of the greenhouse, water cautiously at the root until they get into free growth, but sprinkle them lightly over head once or twice a day in bright clear weather. When the plants are thoroughly established they may be watered with clear weak liquid manure twice a-week. Chorozemas are very subject to the attack of a species of Acarus or red spider, peculiar to them, and which it has been found very difficult to remove. The best plan is to place a plant upon its side in

the open air, and then syringe it powerfully with clean water for five or ten minutes, taking care that every leaf is thoroughly washed on both sides. This washing should be repeated twice a-week, and if they are much infested it may also be advisable to cover the plants with flowers of sulphur, allowing it to remain two or three days, and then washing it off clean.

Chorozema triangularis is a delicate plant, and requires very careful management. In potting it, no loam must be used as for the stronger growing kinds, and the peat must be of the best quality, very nicely comminuted and intermixed with sand, potsherds, and charcoal broken small. Do not shift too largely until the plants are thoroughly established and strong, and then you must act with considerable caution. A warm part of the green-house, or intermediate house, will be the best situation for this species, and even in the stove we have grown it with considerable success.—A.

THE CULTURE OF LILIUM LANCIFOLIUM.

By Mr. GEORGE FREEMAN, Botanic Garden, Chelsea.

Nat. Order, Liliaceæ.

THE present is a suitable time to commence preparations for growing the varieties of Lilium lancifolium as ornamental pot plants, either for exhibition, or for decorating the conservatory. This class of Liliums is decidedly the best for pot culture, not only on account of their beauty and fragrance, but also from their habit of flowering late in the summer. They are, moreover, easily managed, and are, therefore, very suitable plants for amateur cultivators. Good, strong, healthy bulbs, which have now become cheap, should be purchased at once, and may be potted into the following compost:—three parts peat earth chopped very coarsely, and one part of good loam; a good quantity of sand should be intermixed; the clean, gritty sand which builders use will do, but white sand is better.

To produce a good display, two or three bulbs may be planted together in a pot; six or eight stems form a good plant, and may be produced by planting two or three of the double crown bulbs which are often to be selected from among strong roots, and are more suitable for pot culture than a number of single-eyed bulbs. Number six pots (13 inches diameter) will do very well for two or three such bulbs, which will furnish five, six, or more stems. The plants do best on the one-shift system; the bulbs should, consequently, be planted at once in the pots they are to flower in, taking care that they are well drained. On the two or three inches of broken potsherds, place some of the roughest of the soil, to keep the finer from mixing with, and choking up the drainage; fill up the pots to within three inches of the top, and then place the bulb or bulbs on the surface of the soil, covering about one inch of soil over them. Do not water them after potting, but place them in a cold frame or pit; or beneath the greenhouse stage, if care is taken that they do not get wet from the drippings of the plants above them.

When they commence growing, if under the greenhouse stage, remove them into a frame or pit; and, wherever they are placed, let them, under favourable circumstances, have plenty of air, so as to keep them stocky. Give them a good watering in this stage of their growth, and then let them remain without water for some considerable time; they do not yet require frequent waterings. Keep a watchful eye on them as they advance, that they do not get infested with the green fly, to which they are liable; and if any of these troublesome insects appear, take the plants out of the frame or pit, and give them, singly, a good syringing with tobacco-water, holding the syringe over the central bud, that the tobacco-water may penetrate among the bases of the young leaves, where they are apt to suffer most from the attacks of the aphides. About two hours afterwards, they must be syringed again with clean water, to wash the stain of the tobacco off them. By the latter end of March, or early in April, if the season is a favourable one, they will begin to grow vigorously; they will then require a greater quantity of water, and may be watered overhead, or syringed every genial or mild morning. They must now also have an abundant supply of fresh air. If they are in a frame, it will be a good plan to raise it from the ground, by putting a brick under each corner, by which they will get plenty of bottom air; but the frame must be let down again, if the weather should turn out frosty, or cutting north-east winds should prevail, as is sometimes the case. About the latter end of May they will require turfing up; that is, a square box of fibrous peat should be built up above the pot rim, and pegged together so as to enclose the base of the stems; this must be filled up with the same kind of compost as that in which they were potted, only made finer and more sandy; they will root into this soil, which will assist them very much. The plants must be tied up to the form required, and put into the greenhouse, if the frame is not deep enough to hold them; they should be raised up near to the glass that they may not draw, which they are very apt to do when growing freely. Con-

tinue the syringing every morning when circumstances are favourable, as they are particularly fond of a shower bath. After they become pot-bound, which will be the case some time in June, water regularly with soot-water, which gives them a very healthy dark-green colour; this soot-water is made by putting three pecks of soot to eighteen gallons of water, which will be quite strong enough; stir it well up together, and after it has settled skim off the top, and it is then fit for use. Continue watering with this soot-water until they show signs of flowering. When the flower-buds appear they may either be kept back or hastened—the latter by placing them into the stove, for they do not draw up after they have reached this stage of their development, and will bear a very high temperature if freely watered and syringed. Where there is, say, a dozen plants, it is advisable to push on some of them in the stove; and to keep the others in a cool, shady place, so as to make a succession.

After they have done flowering, turn them out of doors and expose them fully to the sun, that they may ripen well. In case of heavy rains, the pots should be turned on to their sides so as to keep the bulbs somewhat dry, and, to the same end, diminish the watering gradually, until they become quite dry. Then cut off the stems, and store the pots away in some dry place out of doors, until the next season.

In the following February, they may be turned out of the pots, the finest bulbs selected for pot cultivation, and the rest planted out in a prepared reserve bed of soil in the garden. The soil of this bed should be about eighteen inches deep, and rather sandy. Some of these bulbs, after a year's growth, will be strong enough to transplant for flowering into a bed in the flower garden, when they will prove, for late flowering, one of the most attractive of groups. The soil of the bed should be prepared for them after proper drainage is secured. A similar compost to that recommended for pot culture may be used, and plenty of rough material should be mixed through the mass. The bulbs should be taken up every season, for the purpose of removing the offsets; when they may be planted again, and the stock put into the nursery beds until they become flowering bulbs. By following these rules, a sufficient quantity of flowering bulbs may be obtained in three years, to have a bed of each sort. The best time for planting is the end of February or early in March; but it must be before the bulbs show signs of growth. In arranging a mixed bed, the strongest bulbs of the varieties *speciosum* and *punctatum* should occupy the centre; then the strongest of the variety *album*; next the second size *speciosum* and *punctatum*, and then the smaller bulbs of *album*, which is the dwarfest grower.

HARDY CONIFERÆ.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey," &c.

THERE is nothing more pleasing to a benevolent mind than to observe, amid all the bustle and competition of this age of excitement, the daily increasing taste for the beautiful Coniferæ, diffusing itself over the length and breadth of the land. In no other manner, to my apprehension, is the disinterestedness and the noble-mindedness of man so finely developed, as in planting for posterity. How barren and dreary is a country without trees. What scene so beautiful as the landscape adorned with the tall, stately, and conical forms of some trees, the gracefully drooping branches of others, and the ever-changing and beautiful features that each revolving season gives to all. When we now admire the landscape scenery of the country, adorned as it is principally by the natives of the soil—fine fellows, too, the brave old Oak, Elm, Beech, and many others—we cannot help picturing to our minds how great the change will be, and how enriched the embellishment produced over the whole face of the country, when the fine and noble race of Coniferæ, having arrived at the perfect state of maturity, shall contribute an oriental grandeur to the scene. Posterity cannot be too grateful to the many gentlemen—philanthropists in the true sense of the word, who have planted, or are preparing to plant, the hardy denizens of other climes, to give splendour and beauty to the pleasure-grounds and parks, to the hills and valleys of their own estates.

The accounts given by travellers of the rich luxuriance of the large and handsome trees of foreign and distant climes are interesting and instructive. They are also useful, as it has been generally in consequence of such accounts that collectors have been appointed to different parts of the world to send home seeds or plants of all that would be useful or ornamental in this country. It is pleasant to picture to one's self the marked change that the whole face of the country shall undergo, when the noble and magestic Araucaria imbricata, the graceful Deodar Cedar, the beautiful Abies Douglasii and Pinus insignis, P. monticola, and many other majestic Coniferæ of varied and vivid greens, shall be luxuriating with us in all the natural beauty of their native dress.

Nearly all the Coniferæ are valuable for timber, or for ornament, and generally for both. The Thujas, Cypresses, and Junipers, are particularly interesting in their habits of growth, and are suitable

either for exposed situations or on very rocky poor soils about the home grounds. When we hear of some of the Coniferæ being introduced from tropical climates, we are disposed to doubt that they will ever become useful in this country, but we must consider that, although there are many parts, even within the tropics, exposed to a bright sky and intense heat, there are other parts exposed to frosts and snows. In such climates, the range of vegetation naturally adapted for each locality progresses as the range of temperature extends from the sultry valleys to the snow-capped mountains. With the uncertainty that always exists about the proper management of plants introduced from countries but slightly explored, it is satisfactory to know that many Coniferæ have been tested by the most severe winter on record in this country, (1837-38), and have proved hardy.

JUNIPERUS EXCELSA.

As it is probable that many persons who have been nursing their Coniferæ through this severe winter will be disposed to plant them out at the first approach of fine weather, I am induced to caution them against so doing, and to give them a few hints that may be useful when the time arrives for carrying them into practice. At present, the best thing to be done is to select the situations in which they are to be planted, and to turn up the soil into mounds eighteen inches or two feet high, the better to ameliorate and pulverize it by exposure to frost and other atmospheric influences. The situation to be selected should be rather exposed, where a good growth could be made sufficiently early to become matured before the nipping frosts of autumn appear. No practice that we can adopt will change the nature of a plant, but we may be able to influence its susceptibility so far, by good management, as to enable it to withstand the many atmospheric changes to which it may be exposed. The soil being well pulverized and raised into finely sloping mounds, about the middle of May, when all danger of frost is over, is the best time for turning the plants out of their pots into the open ground; where they are to remain to adorn the park scenery or pleasure-ground views. The object in planting them upon mounds is to produce a thorough drainage for the roots and a more agreeable appearance in the landscape. The soil being mulched or covered with the mowings from the pleasure-grounds, or with leaves or any other litter easily procured in summer, will prevent evaporation, and the moisture in the soil will be retained for the healthy vegetation of the roots.

During the summer, when the days are long, the sunlight powerful, and the temperature high, vegetation is excited to produce luxuriant growth. As the days become shorter, the sunlight less powerful, and the temperature lower, a change is produced in the system of the plant, and it gradually subsides into a comparatively dormant state—the leaves being dependant upon the influence of heat and light for their excitability, for the proper elaboration of the sap, and for their healthy perspiration; and when these influences are on the decline, the plant is approaching the state of rest natural to vegetables in all parts of the world. It then attains to a state of rest in which it is able to withstand the severity of winter. Although roots are never entirely inactive, nevertheless their action will in a great measure depend upon the active vitality of the leaves. It is principally by the action of the leaves that the roots are excited to imbibe nourishment from the soil; but when the power of the leaves to perspire aqueous matter, and to absorb the nutritious gases supplied by the atmosphere, ceases, the roots gradually, and in less quantities, imbibe food from the soil to supply the waste produced in the system during the summer and autumn growth of the plant, and to collect a store of organizable matter to supply the demand of the leaves and branches the following spring. When the roots are surrounded with a superabundance of water in badly drained soils, they imbibe it in immoderate quantities, the vessels of the plant become gorged, the tissues lax, and the whole system disorganized; then they are most susceptible of injury from frosts. It is for such reasons advisable to

plant Coniferæ in open or exposed situations, where their growth would be gradually arrested by the coldness and other atmospheric influences of such situations. The truth of the principle is proved by the fact, that in severe winters the more exposed the plants have been grown, the less they have suffered; and, on the contrary, the more they have been sheltered, without being protected artificially, the more severely they have been injured. The following is a list of hardy and handsome Coniferæ, selected either for diversity of foliage or habit of growth:—

Mexican.
Pinus Ayacuhuite.
Pinus apulcensis.
Pinus Devoniana.
Pinus Hartwegii.
Pinus Llaveana.
Pinus Montezumæ.
Pinus macrophylla.
Pinus patula.
Pinus Russelliana.
Pinus Teocote.
Picea religiosa.
Juniperus flaccida.
Juniperus tetragona.

N. W. American.
Pinus macrocarpa.
Pinus insignis.
Pinus Lambertiana.
Pinus monticola.
Pinus Coulterii.
Pinus Sabiniana.
Pinus Sinclairiana.
Abies Menziesii.
Abies Douglasii
Picea amabilis.
Picea grandis.
Picea nobilis.

Indian.
Pinus excelsa.
Pinus Gerardiana.
Cedrus Deodara.
Abies Brunoniana.
Abies Morinda.
Abies Smithiana.
Abies Webbiana.
Thuja orientalis.
Cryptomeria japonica.
Juniperus chinensis.

European.
Pinus halepensis.
Pinus brutia.
Picea cephalonica.
Picea Pinsapo.
Juniperus excelsa.
Juniperus occidentalis.

Sacred Botany.—The Tamarisk—Manna.

THE name of the Tamarisk tree does not occur in our Bibles; nevertheless, the Hebrew word *eshel*, which is met with in two or three passages, is supposed to refer to this tree, which bears, in the Arabic, the name of *asul* or *atul*. The Hebrew *eshel*, in our version, is sometimes translated *grove*, sometimes *tree*. "Abraham planted a *grove* in Beer-sheba" (Gen. xxi. 33). "Saul abode in Gibeah, under a *tree* in Ramah" (1 Sam. xxii. 6). "They took their bones, and buried them under a *tree* at Jabesh" (1 Sam. xxxi. 13).

The Arabic and Hebrew names above quoted are sufficiently correspondent to admit of being referred to the same plant; the more so, as the *asul* offers no violence to the texts in which *eshel* occurs. There is abundant evidence of the existence of Tamarisk trees in Arabia, in Egypt, and in Palestine, where they grow to the size of large trees. One species, *Tamarix orientalis*, bears, in the Arabic, the names of *atl* and *asul*; and its characteristics render it by no means unlikely to have been planted in Beer-sheba by Abraham; for it is one of the few trees which grow, and even flourish and attain a large size in the arid desert; thus affording the advantage of shade in a hot country. Beyond this there is nothing in the texts where the *eshel* is mentioned which serves for the exact identification of the plant intended. Our engraving represents the species above referred to, *T. orientalis*; though there are two or three others very like it in their character, which are found in the same regions. This species is valued in consequence of the excellence of its wood for making charcoal; and also for the astringent gall with which its branches are loaded, which, according to Rosenmuller, are full of a beautiful bright red sap before they become dried up. He also states that the Egyptians use its wood for fuel; and that bowls and drinking-vessels are made of it.

TAMARIX ORIENTALIS.

The *Tamarix* is further interesting as being one of the plants which have been supposed to have yielded the manna of the Israelites, as it does certainly yield a substance which, at the present day, is called *mann* by the Arabs. It is an exudation, which, in the month of June, drops from the thorns

of the Tamarisk; and, if eaten in quantity, is said to be purgative. The Arabs eat it with bread, as they do honey, which it resembles in sweetness, having an agreeable aromatic flavour. It has been supposed to result from the puncture of an insect of the coccus family. But this *manna* by no means answers to all the statements respecting the manna—which we understand to have been altogether a miraculous production: it was certainly so as to its continued supply, if not also as regards the substance itself. It is described as white, like hoar-frost; as round, and of the size of coriander seed; as falling with the dew every morning—a double quantity falling every sixth day; as becoming corrupt and breeding worms, if kept till the second day, except on the Sabbath; as being kneeded into dough, and baked into cakes; as tasting like wafers made with honey; and as suddenly ceasing its supply on the morrow after the people "did eat of the old corn of the land,"—"neither had the children of Israel manna any more" (Josh. v. 12). Many of these particulars do not apply to the *mann;* and, on the whole, it may be doubted whether the gummy exudation of the Tamarisk, or of any other tree,—for several have been suggested,—had anything to do with the daily food of the Israelites during the years of their wanderings.—M.

Review.

Aspects of Nature in different Lands and different Climates, with Scientific Elucidations. By A. Von Humboldt. Translated by Mrs. Sabine. London, Longman and Murray. 2 vols.

(SECOND NOTICE.)

In the Essay on the "Physiognomy of Plants," the author commences with a very graphic sketch of the distribution of organic life over the globe. Not only have the declivities of the highest mountains their appointed inhabitants, but the ocean, even the atmosphere, are filled with living things, either perfect creatures, or the germs of others, borne about by currents to find a new home far from their native spots. Some animals venture even to take up their abode in ice. The vegetable kingdom presents remarkable differences according to the physical position in which its members are placed, and still more strictly marked than in the animal kingdom is the peculiarity of the vegetable world in each particular zone. At all events, the peculiarities of vegetation are much more remarkable than those of the animal kingdom, so far as relates to the general impression produced; animals are small in proportion, are endowed with motion, and frequently withdraw themselves from the eye of man; while plants, fixed objects, by their size and the vast spaces they cover by their accumulated numbers, form the most striking feature of the landscape in all but the most barren regions.

The eye is gladdened in a temperate and well-watered district, by the cheerful carpet of turf, unknown in hotter climates, where the grasses grow in ranker development, in isolated tufts, or even, as the bamboo, become arborescent, while the delicate, tender herbs are exchanged for half-woody shrubs or taller herbs, in either case for plants incapable of being reduced to the soft uniform growth of our pastures. Under a hotter sun the scene changes in a way dependent chiefly upon the position of a region in regard to the currents of air and vicinity of mountains, since, on the one hand, the burning heat may draw forth that prodigious luxuriance of vegetation which is met with in the well-watered regions of South America, on the east side of the Andes; while, should the watery vapour be absent from the winds blowing over the region, as in some places on the west side of the Andes, and over the central tracts of Northern Africa, vegetation perishes from the parching drought.

Passing from the general views, the author selects certain remarkable types, as representing the forms giving the most striking features to the scenery of different parts of the globe, and concludes with some reflections on the pleasure to be derived by the contemplation of their grouping, and the great field that lies open to landscape painters, in the study of the vegetable forms of warmer regions in their native countries. This last consideration is one that deserves great attention; there is nothing that the lover of plants feels the want of so much as good representations of the vegetation of other lands. Scarcely anything of the kind exists at present, artists generally represent the trees under a few conventional forms, seldom noting them with any accuracy in nature, and usually fill up the details of their finished drawings by the aid of imperfect memory, or, still worse—imagination. Flowers and single plants we can see in our conservatories and stoves, but the untravelled botanist is at a loss when he tries to picture to himself the glorious vegetation of tropical climates; language may go far, but good drawings are the great desideratum in this department of physical geography.

Passing to the "Annotations and Additions," we meet with a very interesting note upon the probable numbers of existing plants. This is of considerable length, and we shall select only portions of it, giving the general results of the calculations at which the author arrives.

"If, then, we would attempt to solve the question spoken of in the early part of this dissertation, by giving in an approximate manner the numerical limit (le nombre limite of French mathematicians), which the whole phanerogamæ, now existing on the surface of the earth, cannot be supposed to fall short of, we may perhaps find our safest guide in a comparison of the numerical ratios (which, as we have seen, may be assumed to exist between the different families of plants), with the number of species contained in herbariums, and cultivated in our great botanic gardens. I have said that in 1820 the number of species contained in the herbariums of the Jardin des Plantes at Paris was already estimated at 56,000. I do not permit myself to conjecture the amount which the herbariums of England may contain; but the great Paris herbarium, which was formed with much personal sacrifice by Benjamin Delessert, and given by him for free and general use, was stated at his death to contain 86,000 species; a number almost equal to that which, as late as 1835, was conjecturally assigned by Lindley as that of all the species existing on the whole earth. (Lindley, Introduction to Botany, 2d edit., p. 504). Few herbariums have been reckoned with care, after a complete and strict separation and withdrawal of all mere

varieties. Not a few plants contained in smaller collections, are still wanting in the greater herbariums which are supposed to be general or complete. Dr. Klotzsch estimates the present entire number of phænogamous plants in the great Royal Herbarium at Schoneberg, near Berlin, of which he is the curator, at 74,000 species.

Loudon's useful work, Hortus Britannicus, gives an approximate view of all the species which are, or at no remote time have been, cultivated in British gardens: the edition of 1832 enumerates, including indigenous plants, exactly 26,660 phænogamous species. We must not confound with this large number of plants which have grown or been cultivated at any time and in any part of the whole British Islands, the number of living plants which can be shown at any single moment of time in any single botanic garden. In this last-named respect the Botanic Garden of Berlin has long been regarded as one of the richest in Europe. The fame of its extraordinary riches rested formerly only on uncertain and approximate estimations, and, as my fellow-labourer and friend of many years' standing, Professor Kunth, has justly remarked (in manuscript notices communicated to the Gartenhau-Verein in December, 1846), 'no real enumeration or computation could be made until a systematic catalogue, based on a rigorous examination of species, had been prepared. Such an enumeration has given rather above 14,060 species; if we deduct from this number 375 cultivated Ferns, we have remaining 13,685 phænogamous species; among which we find 1,600 Compositæ, 1,150 Leguminosæ, 428 Labiatæ, 370 Umbelliferæ, 460 Orchideæ, 60 Palms, and 600 Grasses and Cyperaceæ. If we compare with these numbers those of the species already described in recent works,—Compositæ (Decandolle and Walpers) about 10,000; Leguminosæ, 8,070; Labiatæ, (Bentham), 2,190; Umbelliferæ, 1,620; Grasses, 3,544; and Cyperaceæ (Kunth. Enumeratio Plantarum), 2,000;—we shall perceive that the Berlin Botanic Garden cultivates, of the very large families, Compositæ, Leguminosæ, and Grasses, only 1-7th, 1-8th, and 1-9th;—and of the small families, Labiatæ and Umbelliferæ, about 1-5th or 1-4th, of described species. If, then, we estimate the number of all the different phænogamous plants, cultivated at one time in all the botanic gardens of Europe at 20,000, we find that the cultivated species appear to be about the eighth part of those which are already either described or preserved in herbariums, and that these must nearly amount to 160,000. This estimate need not be thought excessive, since of many of the larger families, (for example, Guttiferæ, Malpighiaceæ, Melastomeæ, Myrtaceæ, and Rubiaceæ), hardly a hundredth part are found in our garden.' If we take the number given by Loudon, in his Hortus Britannicus, (26,660 species,) as a basis, we shall find—according to the justly drawn succession of inferences of Professor Kunth, in the manuscript notices from which I have borrowed the above—the estimate of 160,000 species rise to 213,000; and even this is still very moderate, for Heynhold's Nomenclator botanicus Hortensis (1846) even rates the phænogamous species then cultivated at 35,600; whereas I have employed Loudon's number for 1832, viz., 26,660. On the whole, it would appear from what has been said,—and the conclusion is at first sight a sufficiently striking one—that at present there are almost more known species of phænogamous plants (with which we are acquainted by gardens, descriptions, or herbariums), than there are known insects."

"If these considerations have led us to the proportion borne by the species of plants cultivated in gardens to the entire amount of those which are already either described or preserved in herbariums, we have still to consider the proportion borne by the latter to what we conjecture to be the whole number of forms existing upon the earth at the present time, *i. e.* to test the assumed minimum of such forms by the relative numbers of species in the different families, therefore, by uncertain multipliers. Such a test, however, gives for the lowest limit or minimum number results so low as to lead us to perceive that even in the great families,—our knowledge of which has been of late most strikingly enriched by the descriptions of botanists,—we are still acquainted with only a small part of existing plants. The Repertorium of Walpers completes Decandolle's Prodromus of 1825 up to 1846; we find in it, in the family of Leguminosæ, 8,068 species. We may assume the ratio, or relative numerical proportion of this family to all phænogamous plants, to be 1-21th—as we find it 1-10th within the tropics, 1-16th in the middle temperate, and 1-33rd in the cold northern zone. The *described* Leguminosæ would thus lead us to assume only 169,400 existing phænogamous species on the whole surface of the earth, whereas, as we have shown, the Compositæ indicate more than 160,000 already *known* species. The discordance is instructive, and may be further elucidated and illustrated by the following analogous considerations.

The major part of the Compositæ, of which Linnæus knew only 785 species, and which has now grown to 12,000, appear to belong to the Old Continent; at least Decandolle described only 3,590 American, whilst the European, Asiatic, and African species amounted to 5,093. This apparent richness in Compositæ is, however, illusive, and considerable only in appearance; the ratio or quotient of the family, 1-15th between the tropics, 1-7th in the temperate zone; and 1-13th in the cold zone, shows that even more species of Compositæ than Leguminosæ must hitherto have escaped the researches of travellers; for a multiplication by 12 would give us only the improbably low number of 144,000 phænogamous species. The families of Grasses and Cyperaceæ give still lower results, because comparatively still fewer of their species have been described and collected. We have only to cast our eyes on the map of South America, remembering the wide extent of territory occupied by grassy plains, not only in Venezuela and on the banks of the Apure and the Meta, but also to the south of the forest-covered regions of the Amazons, in Chaco, Eastern Tucuman, and the Pampas of Buenos Ayres and Patagonia, bearing in mind that of all these extensive regions the greater part have never been explored by botanists, and the remainder only imperfectly and incompletely so. Northern and Central Asia offer an almost equal extent of Steppes, but in which, however, dicotyledonous herbaceous plants are more largely mingled with the Gramineæ. If we had sufficient grounds for believing that we are now acquainted with half the phænogamous plants on the globe, and if we took the number of known species only of one or other of the before-mentioned numbers of 160,000 or 213,000, we should still have to take the number of grasses (the general proportion of which appears to be 1-12th), in the first case at least at 26,000, and in the second case at 35,000 different species, which would give respectively in the two cases only either 1-8th or 1-10th part as known.

"The assumption that we already know half the existing species of phænogamous plants is farther opposed by the following considerations. Several thousand species of Monocotyledons and Dicotyledons, and among them tall trees,—I refer here to my own Expedition,—have been discovered in regions, considerable portions of which had been previously examined by distinguished botanists. The portions of the great continents which have never even been trodden by botanical observers, considerably exceed in area those which have been traversed by such travellers, even in a superficial manner. The greatest variety of phænogamous vegetation, *i.e.*, the greatest number of species on a given area, is found between the tropics, and in the sub-tropical zones. This last-mentioned consideration renders it so much the more important to remember how almost entirely unacquainted we are, on the New Continent, north of the equator, with the Floras of Oaxaca, Yucatan, Guatimala, Nicaragua, the Isthmus of Panama, Choco, Antioquia, and the Provincia de los Pastos; and south of the equator, with the Floras of the vast forest region between the Ucayale, the Rio de la Madera, and the Tocantin (three great tributaries of the Amazons), and with those of Paraguay and the Provincia de los Missiones. In Africa, except in respect to the coasts, we know nothing of the vegetation from 15 deg. north, to 20 deg. south latitude; in Asia we are unacquainted with the Floras of the south and south-east of Arabia, where the highlands rise to about 6,400 English feet above the level of the sea,—of the countries between the Thian-schan, the Kuenlün, and the Himalaya, all the west part of China, and the greater part of the countries beyond the Ganges. Still more unknown to the botanist are the interior of Borneo, New Guinea, and part of Australia. Farther to the south the number of species undergoes a wonderful diminution, as Joseph Hooker has well and ably shown from his own observation in his Antartic Flora. The three islands of which New Zealand consists extend from 34½ deg. to 47¼ deg. S. latitude, and as they contain, moreover, snowy mountains of above 8,850 English feet elevation, they must include considerable diversity of climate. The Northern

Island has been examined with tolerable completeness from the voyage of Banks and Solander to Lesson, and the Brothers Cunningham and Colenso; and yet in more than seventy years we have only become acquainted with less than 700 phænogamous species. (Dieffenbach, Travels in New Zealand, 1843, vol. i., p. 419.) The paucity of vegetable corresponds to the paucity of animal species. Joseph Hooker, in his Flora Antartica, p. 73-75, remarks that 'the botany of the densely-wooded regions of the Southern Islands of the New Zealand group, and of Fuegia, is much more meagre, not only than that of similarly clothed regions of Europe, but of islands many degrees nearer to the Northern Pole than these are to the Southern one. Iceland, for instance, which is from 8 to 10 degrees farther from the equator than the Auckland and the Campbell Islands, contains certainly five times as many flowering plants. In the Antartic Flora, under the influence of a cool and moist, but singularly equable climate, great uniformity, arising from paucity of species, is associated with great luxuriance of vegetation. This striking uniformity prevails both at different levels, (the species found on the plains appearing also on the slopes of the mountains,) and over vast extents of country, from the south of Chili to Patagonia, and even to Tierra del Fuego, or from lat. 45 to 56 deg. Compare, on the other hand, in the northern temperate region, the Flora of the south of France, in the latitude of the Chonos Archipelago on the coast of Chili, with the Flora of Argyleshire in Scotland in the latitude of Cape Horn, and how great a difference of species is found; while in the Southern Hemisphere the same types of vegetation pass through many degrees of latitude. Lastly, on Walden Island, in lat. 80½ deg. N., or not ten degrees from the North Pole of the earth, ten species of flowering plants have been collected, while in the southernmost islet of the South Shetlands, though only in lat. 63 deg. S.. only a solitary grass was found.' These considerations on the distribution of plants confirm the belief that the great mass of still unobserved, uncollected, and undescribed flowering plants must be sought for in tropical countries, and in the latitudes from 12 to 15 deg. distant from the tropics."

Among the other extensive notes to this essay, all very full of information on interesting points, we may especially point to those on the "fertilisation of flowers," the "colossal size and great age of trees," and the special notes devoted to each of the typical forms of vegetation, especially those of the Palms and the Coniferæ. Finally, there is a supplementary note on the physiognomical classification of plants, from which we make our final extract, convinced that our readers will desire to see more of the book.

"As, therefore, a 'physiognomic classification,' or a division into groups from external aspect or 'facies,' does not admit of being applied to the whole vegetable kingdom, so also, in such a classification, the grounds on which the division is made are quite different from those on which our systems of natural families and of plants (including the whole of the vegetable kingdom) have been so happily established. Physiognomic classification grounds her divisions and the choice of her types on whatever possesses 'mass,'—such as shape, position, and arrangement of leaves, their size, and the character and surfaces (shining or dull) of the parenchyma,—therefore, on all that are called more especially the 'organs of vegetation,' *i. e.* those on which the preservation,—the nourishment and development,—of the individual depend; while systematic botany, on the other hand, grounds the arrangement of natural families on the consideration of the organs of propagation,—those on which the continuation or preservation of the species depends. (Kunth, Lehrbuch der Botanik, 1847, Th. i. S. 511; Schleiden, die Pflanze und ihr Leben, 1848, S. 100.) It was already taught in the school of Aristotle (Probl. 20, 7), that the production of seed is the ultimate object of the existence and life of the plant. Since Caspar Fried. Wolf (Theoria Generationis, § 5-9), and since our great (German) poet, the process of development in the organs of fructification has become the morphological foundation of all systematic botany.

"That study, and the study of the physiognomy of plants, I here repeat, proceed from two different points of view: the first from agreement in the inflorescence or in the delicate organs of reproduction; the second from the form of the parts which constitute the axes (*i. e.* the stems and branches), and the shape of the leaves, dependent principally on the distribution of the vascular fascicles. As, then, the axes and appendicular organs predominate by their volume and mass, they determine and strengthen the impression which we receive; they individualise the physiognomic character of the vegetable form and that of the landscape, or of the region in which any of the more strongly-marked and distinguished types severally occur. The law is here given by agreement and affinity in the marks taken from the vegetative, *i. e.* the nutritive organs. In all European colonies, the inhabitants have taken occasion, from resemblances of physiognomy (of 'habitus,' 'facies,') to bestow the names of European forms upon tropical plants or trees bearing very different flowers and fruits from those from which the names were originally taken. Everywhere, in both hemispheres, northern settlers have thought they found alders, poplars, apple and olive trees. They have been misled in most cases by the form of the leaves and the direction of the branches. The illusion has been favoured by the cherished remembrance of the trees and plants of home, and thus European names have been handed down from generation to generation; and in the slave colonies there have been added to them denominations derived from negro languages.

"The contrast so often presented between a striking agreement of physiognomy and the greatest diversity in the inflorescence and fructification,—between the external aspect as determined by the appendicular or leaf-system, and the reproductive organs on which the groups of the natural systems of botany are founded,—is a remarkable and surprising phenomenon. We should have been inclined beforehand to imagine that the shape of what are exclusively termed the vegetative organs, for example, the leaves, would have been less *independent* of the structure of the organs of reproduction; but in reality such a dependence only shows itself in a small number of families,—in Ferns, Grasses, and Cyperaceæ, Palms, Coniferæ, Umbelliferæ, and Aroideæ. In Leguminosæ the agreement in physiognomic character is scarcely to be recognised until we divide them into the several groups (Papilionaceæ, Cæsalpinieæ, and Mimoseæ). I may name, of types which, when compared with each other, show considerable accordance in physiognomy with great difference in the structure of the flowers and fruit, Palms and Cycadeæ, the latter being more nearly allied to Coniferæ; Cuscuta, one of the Convolvulaceæ, and the leafless Cassytha, a parasitical Laurineæ; Equisetum, (belonging to the great division of Cryptogamia,) and Ephedra, closely allied to Coniferæ. On the other hand, our common gooseberries and currants (Ribes) are so closely allied by their inflorescence to the Cactus, *i. e.* to the family of Opuntiaceæ, that it is only quite recently that they have been separated from it! One and the same family (that of Asphodeleæ) comprises the gigantic Draeæna Draco, the common asparagus, and the Aletris with its coloured flowers. Not only do simple and compound leaves often belong to the same family, but they even occur in the same genus. We found in the high plains of Peru and New Granada, among twelve new species of Weinmannia, five with 'foliis simplicibus,' and the rest with pinnate leaves. The genus Aralia shows still greater independence in the form of the leaves: 'folia simplicia, integra, vel lobata, digitata et pinnata.' (Compare Kunth, Synopsis Plantarum quas in itinere collegerunt, Al. de Humboldt et Aim. Bonpland, T. iii. p. 87 and 360).

"Pinnated leaves appear to me to belong chiefly to families which are in the highest grade of organic development, namely, the Polypetalæ; and among these, in the Perigynic class, to the Leguminosæ, Rosaceæ, Terebinthaceæ, and Juglandeæ; and in the Hypogynic, to the Aurantiaceæ, Cedrelaceæ, and Sapindaceæ. The beautiful doubly-pinnated leaves which form one of the principal ornaments of the torrid zone, are most frequent among the Leguminosæ, in Mimoseæ, also in some Cæsalpinieæ, Coulterias, and Gleditschias; never, as Kunth remarks, in Papilionaceæ. 'Folia pinnata' and 'folia composita' are never found in Gentianeæ, Rubiaceæ, and Myrtaceæ. In the morphological development presented by the abundance and variety of form in the appendicular organs of Dicotyledones, we can at present discern only a small number of general laws."

C.T.R. del

Erica elegantissima.

ERICA ELEGANTISSIMA.

Nat. Order, Ericaceæ, ? Ericeæ.

Generic Character.—Erica, *Linn.*—*Calyx* four-toothed, or four-parted. *Corolla* hypogynous, various—globose, urceolate, tubular, campanulate or salver-shaped, limb four-toothed. *Stamens* 8, inserted beneath an hypogynous disk, included or exserted; *filaments* free; *anthers* terminal or lateral, distinct or cohering at the base, unarmed, awned or crested, cells bursting at the apex by a lateral foramen. *Ovary* four-celled, cells many-seeded; *style* filiform; *stigma* capitate, cup-shaped, or peltate. *Capsule* four-celled, bursting loculicidally into four valves, the valves bearing the septa on their middle; septa opposite, alternate, or sometimes adnate to the angles of the central, four-sided or four-winged placentiferous column. *Seeds* numerous, oval, reticulated.—(*Endlicher.*)

Sub-genus.—Stellanthe.—Tube of the corolla globose, ovate or elongated, inflated at the base, or more rarely equal; throat contracted; limb flat, spreading like a star. Anthers lateral, included in the tube, unarmed, awned or crested.—(*Decandolle, Prodromus.*)

Erica elegantissima.—(*Hybrid.*)—Leaves somewhat four-ranked, linear, obtuse, ciliated, and with a short thickened point; squarrosely recurved; sepals linear-lanceolate, attenuated from the middle, obtuse, ciliated, somewhat cartilaginous; tube of the corolla urceolate-cylindrical, 9-10 lines long, purplish-crimson, minutely viscous-pubescent; teeth white, short, entire, spreading.

Synonymy.—*Erica elegantissima* of gardens.

Description.—A dwarf shrub of close habit; the stems well covered with squarrosely spreading, rather pale green, linear, obtuse leaves. It produces its flowers in clusters of fours up the lateral shoots, and the flowers are large and showy. The inflated base of the tube is contracted gradually upwards, and is of a deep purplish crimson; the white, triangular teeth, spread horizontally from the throat. The leaves and sepals are ciliated, with rather distant glandular hairs.

History.—Our drawing is from a plant in the greenhouse of Messrs. Henderson, Wellington Road, St. John's Wood. It is said to be a hybrid, between Erica hiemalis and E. Hartnelli, (ciruita, *Loddiges Bot. Cab.* 1432), the latter of which is supposed to be a hybrid, belonging to the Ampullaceous group of the section Eurylona *(Don)*. As a winter-bloomer it is a valuable variety; and it promises to bloom freely. The flowers were paler than usual in the specimen from which our figure was obtained, on account of the plant having been kept close, still the contrast between the colours of the limb and tube was very pleasing.—A. H.

The generic name Erica, altered by Pliny from the *ereike* of Theophrastus, is derived from the Greek *ereiko*, to break in pieces, on account, as some say, of the brittleness of their branches, or, according to others, from the supposed virtues of some of the species in breaking the stone in the bladder.

Culture.—This very pretty addition to our stock of winter blooming Heaths must be placed among the hard-wooded section, and, we fear, like some of its companions, will be found of rather slow growth. The plant from which our drawing was made was rather stunted in appearance, but, we hope, when young plants come to be grown freely from the cutting-pot, they will improve. Having originated, in part, from E. hiemalis, a remarkably free-growing plant, we should hope that it may, in some measure, take after that species, and grow very freely; at any rate, it is a very distinct and desirable variety, and, we have no doubt, will receive, as it merits, careful management. Heaths delight in turfy peat soil, liberally intermixed with white sand and potsherds, or pieces of charcoal broken small. If the plants are healthy, and well rooted, give them a liberal shift, that is, from a three-inch to a six-inch pot, taking especial care to drain the pot properly; but, if the plants are badly rooted, a smaller shift will suffice, until you get them into free growth. Water carefully, with soft water, especially after the plants are fresh potted; but, at the same time, recollect that more Heaths are destroyed by the want of water than by receiving too much.

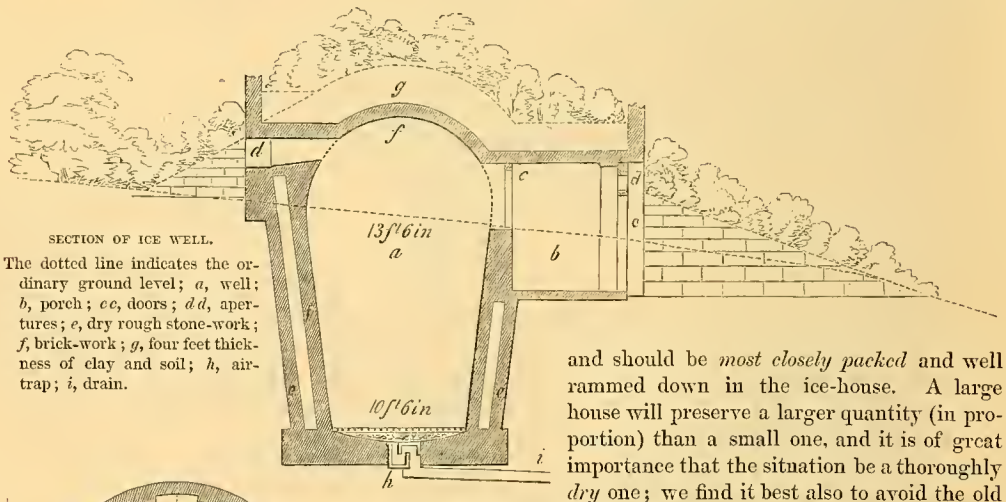
Heaths are propagated by cuttings formed of the tender tips of the young shoots, about an inch in length; these are carefully prepared to avoid bruising any part of the stem, and are inserted in cutting pots prepared with a surface of firmly-pressed, pure, and moistened white sand; after watering, to settle the sand close about them, and allowing the moisture to subside, they are covered with bell-glasses, the edges of which are pressed a little into the surface of the sand, so as to completely exclude the air. They are then placed in a propagating house, or in a spent hot-bed. The glasses should be wiped inside, if much dampness accumulates. When they begin to root, which will appear from the starting of the shoots, they must have a little air daily, to harden them previously to removing the bell-glasses entirely.—A.

ON THE MANAGEMENT OF ICE IN STACKS AND ICE-HOUSES.

By Mr. H. BAILEY, C.M.H.S., Gardener to G. Harcourt, Esq., Nuneham Park.

AS we make advances towards refined civilization, so do our luxuries become necessary to existence; and there is, perhaps, no more striking proof of this, than the demand for ice in the summer months, since this commodity has been placed within reach by the facility of transit, which has brought the solid crystal blocks of Wenham Lake into our shop-windows at midsummer—thus making it common to all. In large establishments in this country the demand for ice is much on the increase, and, where an ordinary ice-house was formerly deemed sufficient, two are now filled, and these are aided by large stacks for early use. It has thus become an important part of the gardener's business to secure for his employer an ample quantity, and it is hoped that the following observations connected with the general management of ice for domestic purposes, may not be without interest to the readers of the *Gardeners' Magazine of Botany*.

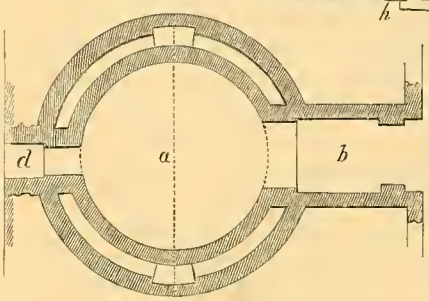
In the first place, the source from whence the ice is to be obtained should be, if possible, a broad expanse of water, kept perfectly clear from weeds, and from the falling leaves of trees, for nothing is more unsightly than dirty ice; the water, therefore, from which ice is to be procured for family use, should neither be margined nor overhung by trees, which exercise a powerful influence in preventing the surface from freezing, by arresting the radiation of heat. This may be seen any frosty morning: for the exposed portion of a pond will be covered with ice, whilst that which is sheltered by branches will not be so. Having a moderate thickness of clear ice, we will suppose it carted to the ice-house, where it should be minutely broken up, on a clean and solid floor; it cannot be too finely broken,



SECTION OF ICE WELL.

The dotted line indicates the ordinary ground level; *a*, well; *b*, porch; *cc*, doors; *dd*, apertures; *e*, dry rough stone-work; *f*, brick-work; *g*, four feet thickness of clay and soil; *h*, air-trap; *i*, drain.

and should be *most closely packed* and well rammed down in the ice-house. A large house will preserve a larger quantity (in proportion) than a small one, and it is of great importance that the situation be a thoroughly *dry* one; we find it best also to avoid the old plan of using straw up the sides, because when this material gets damp, it assists, like the wet blanket of the hydropathists, in wasting the body, and hastening the departure of the patient. There is an American plan, which has been successfully practised in this country, at Lord Lilford's, in Northamptonshire, and at Lord Jersey's, in Oxfordshire—on the principle of getting rid of humidity; it consists in having a small aperture in the door of the house, to open and shut at pleasure, with a corresponding one in the opposite wall. These doors are opened every night, and closed again early in the morning; thus admitting a current of dry, cool air, and carrying off the condensed moisture, which would hourly be exerting its wasting influence on the ice. The accompanying sketch shows the plan.



PLAN OF ICE WELL.

References same as in Section.

Much waste of ice is occasioned by the incautious and frequent opening of the house. This is to be avoided by the use of ice preservers, which are now much in request, and which keep the ice for several days without waste. The house should always be opened in the cool of the morning. It

will thus be seen that the main points to attain success are, to get clear ice, to pound it almost to powder, and to secure escape for accumulated moisture.

A word in regard to the situation of the ice-house may not be out of place here. It should be screened from the powerful rays of the sun by lofty trees, but may be open to the north, rather than overhung by their branches, which prevents the radiation of the heat which the roof accumulates in hot, dry weather, and generates a dampness, which is detrimental, however occasioned.

Ice-stacks are made in various forms, and of different dimensions, and, for the sake of economy in carriage, generally near the water, upon a sloping bank. I know a gentleman who does not break his ice for stacking, but fills up the interstices with snow and water; but this is a "penny wise and pound foolish" practice, as it is impossible to get it into so compact and solid a mass, or to make all the angles unite, so as to exclude the air. At Berkeley Castle, the seat of Lord Fitzhardinge, there is no ice-house, but the family depend for a large consumption entirely upon an immense stack of 200 loads, which is annually stored when there is sufficient frost to enable them to do so. This stack has gone on for many years, and has never been known to fail. The situation is on a bank opened to the north, but screened by trees from the south. A platform of large rough flag-stones forms the foundation upon which the ice is broken and piled, in the form of a parallelogram, its section being a triangle, with its base shorter than its sides. When finished, it is covered with about eighteen inches of thatch, which is again surrounded by large hurdles thickly thatched. This is opened without scruple as the ice is wanted, and Mr. M'Intosh, the gardener there, says he would not advise any one to build an ice-house; but it is a work of great cost to get together so unlimited a quantity of ice.

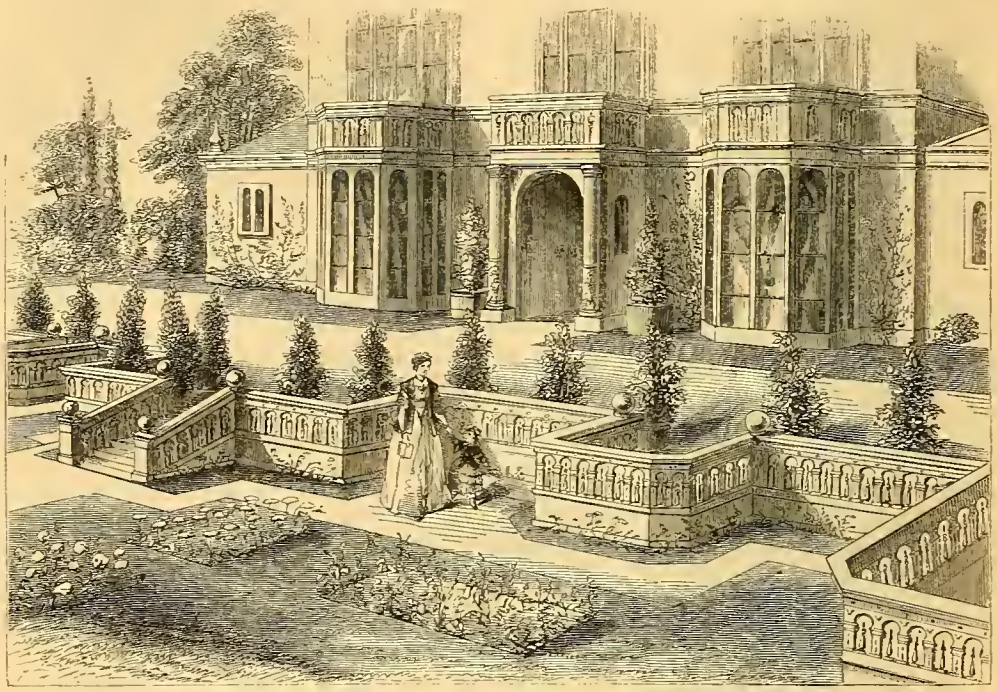
From all I have been able to collect upon the subject of making ice-stacks, I think, in general, that they may be regarded rather as useful auxiliaries, than as substitutes for a good ice-house; I say useful auxiliaries, inasmuch as they enable you to postpone the opening of the house till the autumnal months. At Easter and Whitsuntide, when most families resort for a short time to their country seats, some ice is wanted, and if the main stock is opened, its wasting is much accelerated.

There should always be a provision for carrying off the water which is collected on the roof of an ice-house, as it should never be allowed to fall on the ground or to saturate the side-walls; the best situation for it is on the side of a steep and dry bank.

Much expense in the construction of ice-houses might be avoided by a little consideration; the common practice is to build them in the shape of an inverted cone, this form allowing the ice, as it wastes, to sink into a compact mass. They may, however, be formed square, and of a much less expensive material than bricks. A simple wattling of wood, just to prevent the ice from touching the earth, with a thickly-thatched roof, where the other conditions which have been mentioned are fulfilled, are all that is necessary. Thus, with a few simple and comparatively cheap and rustic materials, and a little knowledge of the laws which govern the diffusion of heat by absorption and radiation, the owner of a villa residence may be enabled to enjoy, in common with the owner of the princely palace, a store of ice, and there can be little doubt but that such will soon be the case.

If the hints here thrown out should be instrumental in promoting this object, the writer will feel that his attention has been directed to a useful end.

[The above communication contains some excellent advice, which may be acted upon with profit by most people. The ice-house under the charge of the writer is covered with rockwork and plants, and, being in an unsheltered situation, the ice did not keep well. It was, therefore, found necessary to take very great pains in filling the house, pounding the ice very small, and converting every layer of two or three inches in thickness into a solid mass, by the use of boiling water, which filled up the interstices between the small pieces of ice. Under this management the supply was extended nearly two months longer than in previous years. The house being domed over, "a man hole" was left in the centre of the dome, for the purpose of filling it more completely than was possible through the side door; and, to save the trouble of removing the straw from the entrance to the well every time ice was wanted, we resolved to take the supply through the "man hole," by letting a boy down, and drawing the supply up with a bucket. This was found a great improvement, inasmuch as no litter was made, and a supply could be taken without filling the house with warm air, because the air in the well being colder, and of course heavier, than the external air on a warm summer day, no change could possibly take place. We used also to ventilate the house occasionally, by removing the cover of the "man hole" during the night. This arrangement we found to answer a good purpose, and we think it quite worthy the attention of those about to erect an ice-house, for which purpose no better directions can be furnished than those supplied by Mr. Bailey.—A.]



GARDEN TERRACE, SHOWING THE ARRANGEMENT OF PYRAMIDAL PELARGONIUMS.

THE MANAGEMENT AND TRAINING OF PYRAMIDAL PELARGONIUMS.

By Mr. GEORGE M'EWEN, Gardener to the Duke of Norfolk; with some Introductory Remarks and Illustrations by Mr. H. N. HUMPHREYS.

IN those parts of the Continent, where the nature of the climate admits of the cultivation of the Orange tree with much more facility than in England, those noble plants, in their massive square tubs, form the grandest and most appropriate decoration to terrace walks that can be conceived. The effect thus produced can only be witnessed in this country for a short month or two in our royal gardens at Hampton Court, and in a few celebrated private gardens where expense or inconvenience are no objects. The immense accommodation required in the form of orangeries, necessary to furnish terraces with Orange trees in this country, renders their general culture for such a purpose impossible; but other plants, if cultivated expressly for the purposes of terrace decoration, might advantageously supply their place. At more than one establishment with which I am acquainted, I have seen Fuchsias trained to six and eight feet in height, especially for placing out on a terrace during the summer, and if they were trained to the same form as the Pelargoniums, and made to alternate with them, the effect would be very good. I succeeded myself in training some of these plants to a height of about five feet, and then suffered them to form a bushy head, similar to standard Roses or Pomegranates. This forms a pleasing variety, and would contrast well with pyramidal Pelargoniums—for artists find that effects produced by striking contrasts are sometimes more valuable than those obtained by uniformity.

The annexed sketch exhibits a terrace on which Pyramidal Pelargoniums are placed in a manner to produce a very agreeable effect, the acuminating lines of the Pelargoniums contrasting well with the predominant horizontal lines of the terrace, but the full advantage of the arrangement can only be shown by the aid of colour. Sufficient indication is given, however, to enable any person to judge of the general effect which might be produced by Pelargoniums trained in this manner and in a similar position. The species that has been tried for this purpose is not one of the most robust; and I imagine that for out-door purposes the common horse-shoe Pelargonium would form a larger, and perhaps more effective object, particularly if it were to alternate with the new pink variety, or that with variegated foliage, figured at page 25. [With these remarks of Mr. Humphreys on the artistic effects of Pyramidal Pelargoniums, we proceed to Mr. M'Ewen's practical instructions on the subject.]

The end of January, or beginning of February, is a good time to begin to form Pyramidal Pelargoniums. Both old and young plants are available; but, as an expeditious mode has many

advantages, we recommend to select from the old plants the most healthy and high-coloured, and, as the unhandsome can be best spared, choose from those with whose symmetry you are not pleased. Preserve the best centre shoot as the leader; and from it cut away all its rivals, or side shoots; this act will increase lateral shoots, which it must be an object to encourage. Tie up the main shoot to a good strong stake, which may be left longer than is requisite at the time, as a vigorous growth may be anticipated.

The chief attention must now be directed to divert the growth from the top to the under lateral shoots. Stopping the main shoot would tend to it, but this would, for a time, thwart a not less important point—the getting up of the plant. However, by a constant pinching of the upper shoots or rival leaders, by taking off occasionally there a large leaf, and by preserving every leaf, and bending downward, and regulating the shoots at the base and body of the plant, and also by turning and exposing fully to the light the vacant parts, an approach to the form you aim at will be daily augmenting. You must lay aside, for the present, the standing rule, "that when you stop one shoot, you must stop all." Stop and bend to the place wanting, wherever the strong shoots appear, always excepting the centre.

But it will be found that the leader will be occasionally running to flower; in this case stop it, and draw in the next wood shoot. We may here mention that, previous to bending the side shoots much, it is indispensable to have, near the heel of each lateral, what we shall call a guard-tie, that when the shoot is bent,—and it can be done by degrees to a great distance,—the stress of the bend may come upon the tie, and thus prevent the laterals breaking off. We may assume that, about the middle of March, there is a great growth upon the plant, and that the pot is full of roots; and as the making of wood is of primary importance, (for it will take another season to make this a show plant,) it must have a large shift, the drainage perfect, and the soil rich. The size of the pot must be regulated by the vigour and size of the plant; but a shift from an 11-inch, or rather an 8-inch, to a No. 6 or 13-inch pot, is quite compatible with success; this size, too, will support well, and give good proportion to a plant from 5 to 6 feet in height. The soil compose nearly thus:—Turfy loam drawn asunder by the hand, and well decomposed dung, equal parts; one-fourth peat; and silver sand sufficient to colour the whole. Little water will be required until the plant takes with the new soil, and of course this is hastened by giving it a shady, close, and moist atmosphere for a day or two. We said that one stake is sufficient, and we say so still; but, in a little while, a few temporary stakes for the tender shoots may be of service, before provision is made for their permanent support. By the middle of May, the plants should have made an apparent fulness of shoots, and will present an outline of the pyramid. But this fulness is only apparent, for when each of these shoots is extended nine inches or more, large vacant spaces will present themselves; therefore a general stopping of the whole plant must shortly take place. If other things are equal, the best time to do this is when the shoots at the base extend nearly to the rim of the pot after being thus finally stopped. The reason for this will appear, when the final tying in of the plant in June takes place, of which we now speak. Surround the under side of the rim of the pot with a strong wire, with or without eyes. To this fasten, at intervals of six or seven inches, smaller wires to run vertically, and fastened near the top of the stake. To these upright wires may be fastened, if necessary, a few pieces of wire or twine running horizontally; upon this the flowering shoots are tied, and the work is done. We close by submitting a few general directions, which will, no doubt, be useful to a large class of those amateur readers who may be beginning to "grow Geraniums." We will suppose the growing season to begin in February.

February and March.—Temperature at night from 40 to 45 degrees; by day, 10 degrees more. In dull, cold weather, light a little fire; increase the moisture as the season advances, and keep the atmosphere of the house pure by airing daily. Guard against cutting winds. Fumigate, for two or three nights successively, at the first appearance of green fly. In the evenings, towards April, a little guano or liquid manure may be cast about the house. Water the plants only with soft water. Avoid steaming at all periods.

April and May.—Night temperature, from 45 to 50 degrees. By day, 10 to 20 degrees more. Saturate the atmosphere with moisture. Shut up with sun-heat, but give air daily, and at night also when the air is calm and warm. This will prevent the plants drawing. And this also do: keep the plants standing free of each other, and turn them often; see that the sun does not strike on the pot.

June and July.—Night temperature, from 50 to 55 degrees. By day, 60 to 80 degrees. We have entered the maturing and flowering period. Give increased air, and less moisture. When the trusses of flowers appear, then apply weak, clear liquid manure at every alternate watering. The display of flowers will be only moderate compared with what should be next year. To prolong the blooming season, shading and coolness are indispensable; and not less so is gauze or lace, over the openings of the house, to prevent insects, as bees, touching a flower. Pick off the bloom so soon as it fades. Seed-bearing exhausts plants, and so does prolonged flowering; avoid both, for the first year particularly.

August and September.—Night temperature, from 55 to 60 degrees. By day 20 degrees more. Remove the plants to pits, or a sheltered situation. Withhold water, and give the plants the full glare of day. If they are out of doors, lay the pots on their sides. When the wood is brown and firm, and growth stopped, cut the plant well in, giving due attention to keeping the pyramidal shape; and if the shoots at the base are cut to about seven inches, or flush with the pot, it will be right. This is the resting period. But we would greatly recommend to steal a march at this period, and try to have the plants fully matured, and cut back in August. By the end of September, the young shoots will be appearing. Lift the pot, syringe, and give them the benefit of night dews, without watering the ball. Shift the plants, and induce to grow freely.

October and November.—Temperature decrease with the season—from 55 to 40 degrees at night. If the plants are not shifted, do it early, by shaking away the old soil, slightly pruning the roots, and using say an 11-inch pot. The soil must be lighter than before, less rich, perfect drainage, also some bits of charcoal mixed with the soil. A caterpillar infests the plants at this period—keep watching and hand-picking it. Take every advantage of sunny days, and dewy nights; but frost must be vigilantly guarded against from the middle of October. A luxuriant growth is not, at this period, desirable, but a healthy, short-jointed, and vigorous break or push, which must be kept in check until the end of January. Do not excite the plants now in any way.

December and January.—Night temperature from about 35 to 40 degrees. Day from 5 to 10 degrees more. Avoid using much water. In severe weather the house or pits should be covered at night by mats or shutters. This will economise the fuel, and save the energies of the plants. About the beginning of the year the plants may be finally shifted, the house whitewashed, and the temperature slightly increased, advancing afterwards with the season. By fair management you may expect a fine display in time for the June shows of 1851.

Vegetable Physiology.

By ARTHUR HENFREY, F.L.S., Lecturer on Botany at St. George's Hospital.

INFLUENCE OF HEAT AND LIGHT.

THE remaining physical forces which we have to consider are those of heat, light, and, above all, chemical affinity. I do not include electricity here; since, although it must be supposed to exercise a very important agency over vegetables, as well as other material bodies, we are at present wholly without satisfactory data as to the occurrence of electrical phenomena in plants. The various crude speculations which have occasionally been presented in reference to this subject, appear, in most cases, to have originated in a very imperfect knowledge both of the ascertained laws of electricity, and of the structure of plants themselves. It is certain that in those few experiments where portions of plants (in which the vital circulation can be watched, as in the *Chara*,) have been examined, while within the influence of artificial electrical and magnetic arrangements, no interference has been observed; while the destruction of trees by lightning would seem to prove that they are bad conductors, offering some obstacle to the passage of the electric fluid, which then, instead of traversing them freely, as it would a metallic conductor, rends them asunder. Since we know dry wood to be a bad conductor, we must suppose the fluids of living plants to be the cause of any conducting power they may possess, and how the general electricity of the atmosphere may affect the operations going on in these fluids, we are as yet altogether ignorant.

The effects of heat are too well known to require that we should dwell upon them to any extent here; I will merely remark that, in endeavouring to imitate the variations of climate by means of artificial heat in cultivation, we must always bear in mind that light also takes a very important share in producing the differences in the vegetation of different zones. I may allude also to some recent observations on the causes of the distribution of plants, which bear reference to practical points. It has been shown, with a great degree of plausibility, that plants have peculiar *constitutions*, if we may so express it, in regard to heat; that is to say, that each species of plant seems to require a certain amount of heat within its season of active vegetation. Thus, an annual plant, which runs from the state of seed to its own seed-bearing period and death, in six months, in one climate, may pass through the same course of existence in shorter spaces of time, in proportion as the climate in which it grows is hotter. Moreover, plants adapted to different regions appear to have specific fixed points, below which they are, practically speaking, at rest; and thus, although they may require only a certain whole amount of heat for each season, may require to be always at a high temperature, and thus spread their growth over a shorter space of time. For example, if a plant will begin to vegetate with us at our March temperature, and last till October, the same plant may grow and pass through all its stages

in a much shorter space of time in a climate which has a hotter summer; but, on the other hand, many plants which only occupy a short space of time in their growth in a climate where the summer is hotter, cannot be made to spread their season of growth over a longer period in our cooler climate, because they will not flourish below a certain temperature, and that begins too late and ends too soon in our climate. Thus, the Vine and the Indian Corn flourish on the Continent, in places which have a far more severe winter than we have; but the cause of this is, that the summer is very much hotter at the time these particular plants require much heat.

Practically, these facts are of much importance in regard to the successful treatment of perennial exotics; since these may be injured by being allowed to vegetate weakly during the period in which, in their native climate, the severe cold would have arrested their growth, and be thus weakened, so as to interfere with their successful forming into flower at their proper season. It is of great importance, therefore, to study the peculiarities of the native climates of the plants we cultivate, since it is only by an intelligent imitation of these, that we can hope for certain and safe rules for the management of the plants, during their various periods of growth.

The effects of light upon vegetation are perhaps the most important of all the physical phenomena we have to study in plants; but wide as is the field for observation here, we have as yet advanced but a little way into the subject. The now well-known Daguerreotype process gives us a means of conveying an idea of the manner in which light may affect bodies; a still more simple one is its blackening action upon any organic substance, such as paper, which has been touched with nitrate of silver (lunar caustic). In these we see the effect of impalpable, intangible force, producing a chemical change, made known to us by a change of colour. By just such a change of colour does it announce to us its action in plants; in proportion to the force with which light exerts chemical action upon plants, do we see their green colour become deeper; while, if we withhold this influence, as in the blanching of various kitchen-herbs, we find that the green is not produced.

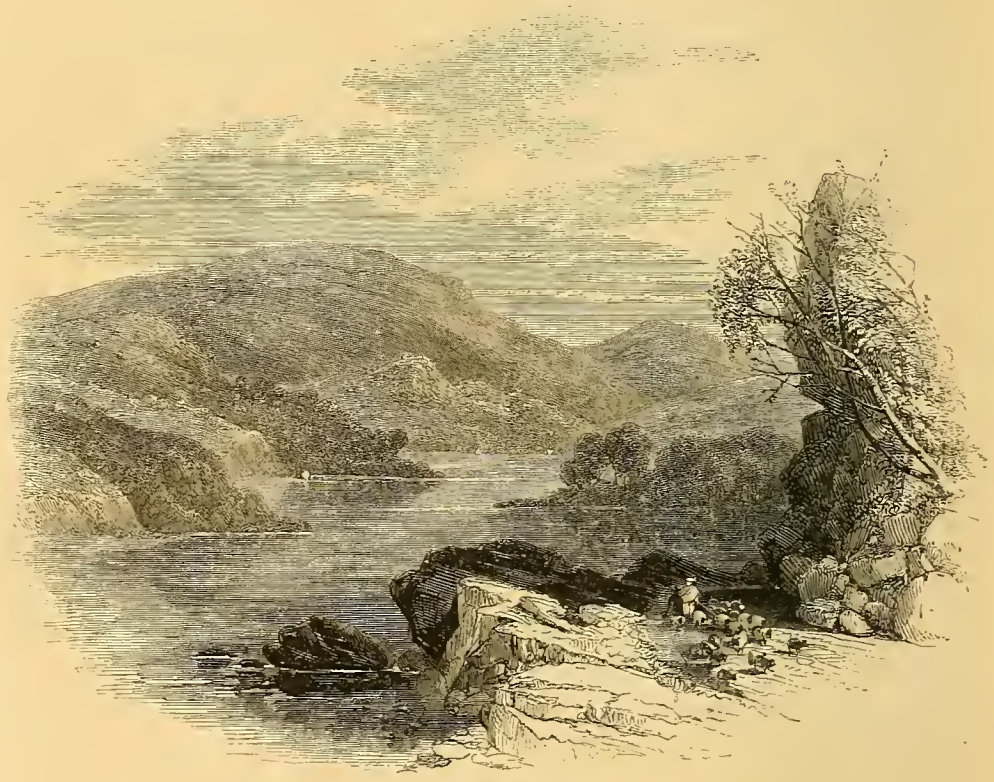
To go into a detailed account of the present state of our knowledge in this department of the subject, might involve us in questions which are beyond the purpose of the present sketches, since recent discoveries have shown that it is not perfect white light simply acting upon the contents of the tissues that we have to study, but that we must inquire into the especial effects of the different component rays which the prism reveals to us, if we would thoroughly understand the mode of nature's operations here. The ray of common light is a compound of the various coloured rays which are displayed in the prismatic spectrum, in the rainbow, and these act upon plants, not only jointly, but individually; thus the yellow part of the light exerts a different action from the blue, &c. Without going further into this part of the question, I will merely caution horticulturists that deductions from the facts as yet before us are scarcely advisable, except for experiment; and although certain coloured lights may favour the development of plants during particular periods, yet as a general rule, and in houses intended to keep plants during their whole periods of growth, it is clear that the perfect white light, which nature gives them in all climates, must be the best, and that when this may be too strong, shading must be used which will lessen the *whole* light, and not take away merely certain rays, as will be done by any coloured glass. Blue light has been said to favour germination, yellow light, flowering, and if this be proved, a blue house might be a useful place for raising seedlings, a yellow one for flowering plants; but the worst of such expedients is, that a portion of light is absolutely lost in passing through these coloured media, and in any case they are unnatural, and therefore to be regarded with suspicion.

With regard to the direct universal action of light upon plants, it is requisite to know something of the internal structure of plants to understand the processes clearly, and I shall therefore have to refer to it again hereafter. For the present, it will suffice to say that, by a peculiar power residing in it, light produces a chemical change in the fluids contained within the cells of plants, and, since this is attended with a separation of certain materials which are given off in the form of gas, as carbonic acid is given off by animals in their breathing, it has generally been called the *respiration* of plants. Some authors question this mode of viewing the process, and regard it as a digestive operation; it seems, however, so far as we know at present, to be a true respiratory process, and one similar in character, but directly opposite in its effects to that of animals. Animals, by means of respiration get rid of superfluous carbon, but the process is here combined with a most important function, the maintenance of the animal heat, which is effected by the carbon being oxidised or burnt by the oxygen of the air, in a manner which, however surprising it may seem to those who learn it for the first time, exactly resembles the more active burning of charcoal, or other carbonaceous matter, where the greater heat is accompanied with flame. In vegetables it is oxygen that is given off (which is consumed by being combined with the carbon in animals), while the carbon remains fixed in the

tissues of the plant. Therefore plants are continually separating what animals combine, and thus the balance is kept up in the atmosphere.

A very important distinction exists, however, in the fact that the presumed respiration of plants is only active under the influence of light; the light effects the separation of the oxygen within the plant, and then this passes off, with the perspiration, through the breathing pores. In animals, where it is necessary that the respiration should be always going on, to keep up the heat, it is made to depend, not upon a periodical influence like that of the sun's light, but upon the affinity between carbon and the oxygen of the air brought into contact with it in respiration.

I have been forced to enter in some degree into chemical questions here, as they are essentially concerned with all that light effects in plants; this anticipation was unavoidable, and if the preceding remarks are not fully comprehended, they will be made more clear by the explanations that I shall have to give of the phenomena of the chemical affinity in plants.



LOCH NESS, FROM THE BLACK ROCK.

THE BOTANICAL FEATURES OF THE SIDES OF LOCH NESS.

By GEORGE ANDERSON, Esq., Inverness.

"The Oak, the Ash, and the bonny Ivy tree,
Ah, they flourish best in the north countrie."—Old Song.

OF botany it has been justly said, that "the spleen is seldom felt where Flora reigns;" and although I cannot expect to add any inducements to its study, yet I will crave the indulgence of my readers while I offer a few observations, made several years ago, giving some faint idea of a district as richly decked with Nature's bounties as any in the British Isles.

We have been accustomed to think of the Highlands as the land of storms, of darkness, and of desolation; and when we have beheld the huge mountains rising in our way and crossing our path, as if forbidding approach to the retired habitations within their bosoms, we can scarcely believe that the rich descriptions of vegetable life, on the rocky bounds of Loch Katrine, so powerfully given by the bard of our times, can extend to the north of that celebrated inlet. Neither will our prepossessions,

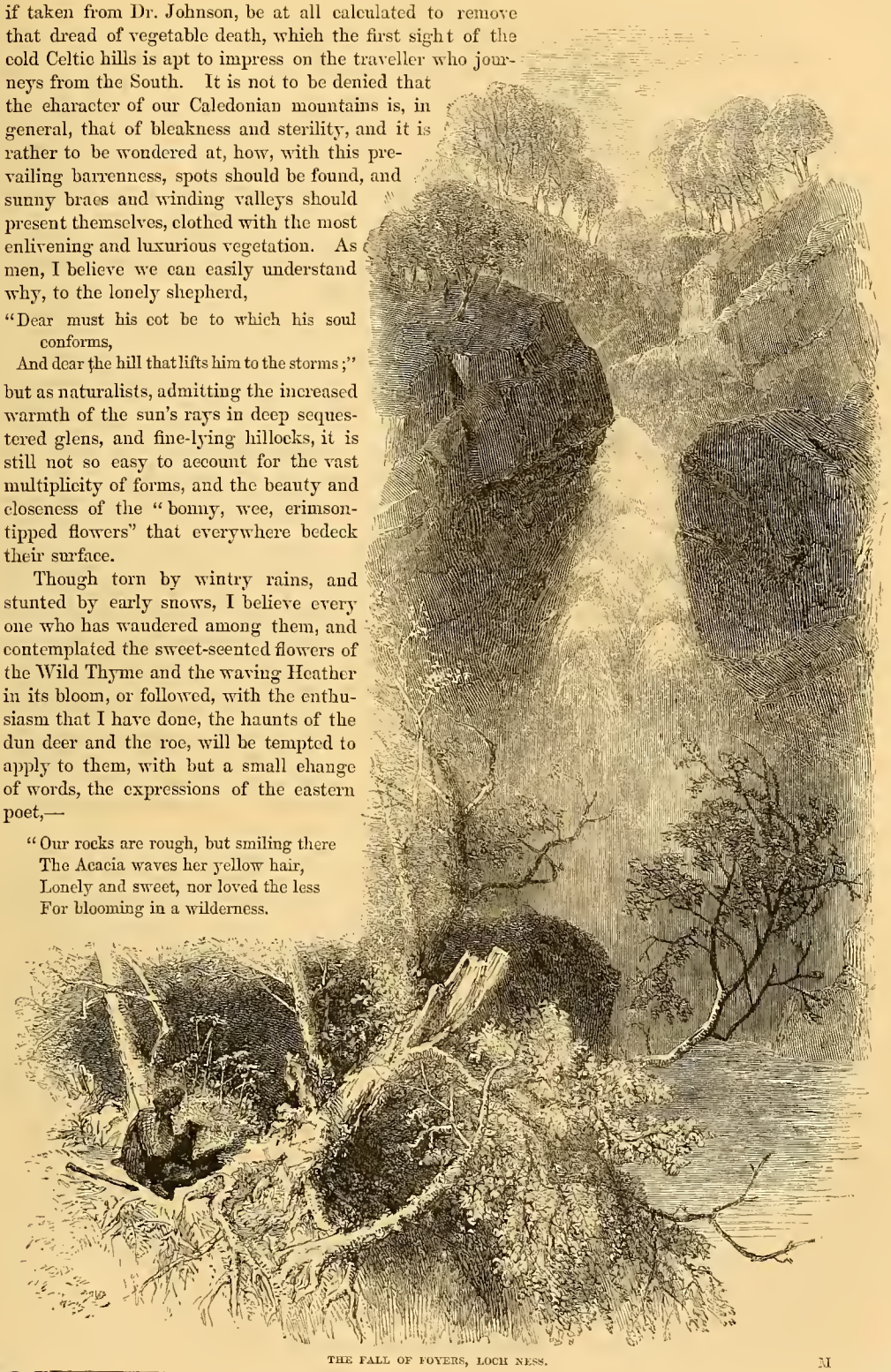
if taken from Dr. Johnson, be at all calculated to remove that dread of vegetable death, which the first sight of the cold Celtic hills is apt to impress on the traveller who journeys from the South. It is not to be denied that the character of our Caledonian mountains is, in general, that of bleakness and sterility, and it is rather to be wondered at, how, with this prevailing barrenness, spots should be found, and sunny braes and winding valleys should present themselves, clothed with the most enlivening and luxurious vegetation. As men, I believe we can easily understand why, to the lonely shepherd,

"Dear must his cot be to which his soul conforms,
And dear the hill that lifts him to the storms;"

but as naturalists, admitting the increased warmth of the sun's rays in deep sequestered glens, and fine-lying hillocks, it is still not so easy to account for the vast multiplicity of forms, and the beauty and closeness of the "bonny, wee, crimson-tipped flowers" that everywhere bedeck their surface.

Though torn by wintry rains, and stunted by early snows, I believe every one who has wandered among them, and contemplated the sweet-scented flowers of the Wild Thyme and the waving Heather in its bloom, or followed, with the enthusiasm that I have done, the haunts of the dun deer and the roe, will be tempted to apply to them, with but a small change of words, the expressions of the eastern poet,—

"Our rocks are rough, but smiling there
The Acacia waves her yellow hair,
Lonely and sweet, nor loved the less
For blooming in a wilderness.



THE FALL OF FOYERS, LOCH NESS. M

"Our sands are bare, but down their slope
The silver-footed antelope
As gracefully and gaily springs,
As o'er the marble courts of kings."

But I believe the variety and beauty of our Alpine and lea plants are well known and generally acknowledged. I am not aware, however, if the number and copiousness of the forest-trees and brushwood plants, to be met with on an extensive survey of the Highlands, have been properly ascertained and noticed, or whether it is generally known that many of those larger trees, which are thought almost peculiar to more southern counties, have been frequently found of tolerable size in many parts of the districts I allude to.

To point out these, and their relative magnitudes, will form one of the objects of this paper, as showing the richness of the foliage and the number of conspicuous plants which enter into the composition of the variegated and highly interesting landscape on the banks of Loch Ness.

But, first, I must offer a general and short description of the face of the country. It is one of the very peculiar features of this part of the island that, similar to the extensive valley which cuts across our southern division, from the Firth of Forth to that of the Clyde, there is in the North an equally extensive one, less elevated, but more abundant in water, which connects, by its lakes and by the Caledonian Canal, the Atlantic Ocean with the German Sea, and which is well known under the name of the Great Glen of Scotland. Two-and-twenty miles of this natural opening is occupied by the deep waters of Loch Ness, and if the mountains which surround its margin are not so picturesque, towering, and rugged, as those of the west coast, they are still more varied in inclination and outline, more protected from the rage of the Atlantic storms, more exposed to the sun, and therefore more favourable to vegetation.

Three or four lateral valleys, all of them differing in botanical characters, according as they are wide or narrow, and traversed by a smooth-flowing stream or a foaming torrent, open themselves to the lake, and discharge their moisture into its collected waters. One of these, called the Glen of Urquhart, is exceedingly beautiful, and much admired from the climbing woods of birch and fir which adorn its sides, screening it from the wintry blast, and from the broad fields of highly cultivated land which occupy its lower acclivities. It expands, at its junction with the lake, into a wide bay, one of whose promontories rises gently in rounded terraces of green coppice and corn land,—where formerly stood one of the early wooden churches of the seventh century, built, according to the Breverium Aberdonense, of hewn oak, and dedicated to St. Moabrutha. The other promontory is crowned with the venerable walls of the Castle of Urquhart, once the seat of the proud Cumyns, Earls of Badenoch, and the last castle which stood out against the usurping arms of Edward the First. In case I should forget afterwards, I may remark, in passing, that here, "where ruin greenly dwells," are found some elegant specimens of the beautiful plant Geranium lucidum.

The hills, stretching on both sides from the Vale of Urquhart, are well clothed with wood, among which the Fir, the Weeping Birch, and the hoary Hawthorn, are conspicuous; but the most interesting feature of them, is the height to which cultivation has been carried, and the curiously-disposed patches and terraces, raised one above another, wherever the slope of the hill, and the absence of stagnant water and brushwood, have allowed and encouraged the exertions of industry. Perhaps the more regular farmer might be disposed to smile at these feeble attempts to copy his skill; but to the lover of picturesque hamlet scenery, as well as to the botanist, they will ever be beautiful and interesting.

The south side of the lake, is equally diversified and romantic; indeed, it forms the avenue to the celebrated Fall of Foyers, of which so many excellent descriptions have been written. At the lower extremity of the lake we find a flat alluvial plain, stretching away towards the town of Inverness and Fort-George. On this plain are situated the regular farms of the district, and from it is seen one of the finest approaches to the lake, as well as the best positions for viewing the grand chains of mountains in the back-ground. The low waving knolls scattered over this plain, with the smooth-flowing sandstone hills which bound its sides, are covered with planted Firs and hard-woods, very different in appearance from those we find rooted in their parent rocks a little way on. On coming to the place where the road is first made to observe the windings of the lake, Highland scenery immediately assumes its wild superiority,—cultivation recedes at every step,—the bare rocks advance to the edge of the road,—the Alpine torrent is heard dashing over their surface,—the wind begins to whistle through the tender branches of the birch,—and the lake, dashing its waves at our feet, all powerfully convince us that we are now fairly in the land of the "mountain and flood."

The road, cut in many places, especially on the north side, out of the solid rocks, winds along their jutting foreheads, overhung with the drooping boughs of the Birch, or shaded by the spreading arms

and trunks of the wild Ash, the Oak, and the Hawthorn. The declivities of the hills above us are covered with thick woods of the same trees, intermingled with the Hazel; the abrupt crags wave with the stately foliage of the purple Fox-glove; the intervening spaces of green sward are filled with twining branches of the white and red Dog Rose, in contrast with the yellow Honeysuckle. Here, then, the botanist should begin his researches; and now I shall proceed to detail his probable success.

To facilitate the recollection and comprehension of the various plants which occupy the margins of the lake, I shall separate them into four divisions, which have corresponding natural positions, and are characteristic of the actual appearances of the country; first, I shall detail those which compose and grow under the natural woods and copses; secondly, those which appear in the open heaths and pastures; thirdly, the Orchideæ, which are common to both these divisions; and lastly, those which grow along the margin of the lake and its adjoining low grounds.

That these divisions frequently become confused and pass into one another there can be no doubt; but the distribution, though somewhat arbitrary, I have found to be extremely useful, and within certain general limits, I have little hesitation in saying that it will be found correct. But there is a subject—the distribution of our Highland, and especially our Alpine plants—which I must decline entering upon at present, as I intend, if possible, to recur to it hereafter. The rocks of the district, I may premise, are Gneiss and Granite, with Old Red Sandstone, hardened and altered by the igneous masses below.

I.—Plants growing in the Wooded Stations adjoining Loch Ness.

Pinus sylvestris. Scotch Fir.—A great deal of this wood has been planted in the neighbourhood of Inverness. It is generally allowed a growth of twenty to forty years, and then cut down for props for the English coal-mines. The native timber is used in carpenter work, and is nearly equal to the Baltic or American. The forests and plantations are rather dark and sombre, and too uniform in colour, but this is changing now, as the Highland lairds are beginning to mix in with the Fir, Larch and hard woods. Formerly it was imagined that no other tree but the Scotch Fir would grow on our hills.

Taxus baccata. Common Yew-tree.—Near some old farm-steadings I noticed several decaying stumps of this tree, and one very large one at Knocky is unquestionably indigenous, and is known to have furnished bows to the ancient Highlanders.

Betula alba. Common Birch.—This elegant tree, intermixed with large specimens of its own beautiful variety, the Weeping Birch, composes almost all the extensive woods on the sides of Loch Ness. Its height varies from four to twenty feet. It is employed in all kinds of domestic purposes; its bark sells high for tanning, and in spring, its sap is collected for making a very agreeable kind of wine. In this district the dwarf or Alpine species—Betula nana—is rare, though more to the north, as in Ross-shire, it is most abundant.

Alnus glutinosa. Common Alder.—Common in low and wet places; it is much used in the manufacture of cask staves.

Pyrus Aucuparia. Mountain Ash or Roan Tree.—Both in flower and in fruit this plant with its palm-like leaves is truly elegant. It occurs in considerable quantities, and its size is well illustrated by those hanging over the Fall of Foyers.

Cratægus Oxyacantha. Hawthorn.—A spreading but rather dwarfish tree; its twisted trunk, however, often attains a great thickness.

Fraxinus excelsior. Common Ash.—Most abundant, and undoubtedly native. It grows generally in the crevices of steep rocks, extending its knotty roots and branches in curious and fantastic forms.

Populus tremula. Aspen or Quaking Ash.—One of our most interesting and beautiful trees. In shaded places, and on the banks of rivers it attains a great height; but its thickness is small and uniform. When compared with the sturdy Oak and Fir, its proportions seem to resemble those of the delicate Ionic column.

Quercus Robur. Oak.—On the hills it is neither large nor abundant, but in the lower slopes it occasionally rises boldly against the storm, either in detached trees, or in close thickets. Enormous stems are found in the mosses, and under gravel beds. I have seen one trunk twenty-four feet in circumference.

Ilex Aquifolium. Holly.—A low, prickly, rounded bush, with generally one single stem shooting up from the centre. It is very abundant at the lower end of the Loch, and in many other parts of the Highlands.

Ulmus campestris and montana. Elm.—Sir W. J. Hooker seems to have some doubts about this genus. Both of the species here put down, I am confident occur native on the banks of this lake.

Corylus Avellana. Hazel Nut.—Extremely abundant, and the nuts of this district are much esteemed.

Prunus Cerasus. Wild Cherry.

Prunus Padus. Bird Cherry.—Both of these species are very abundant on the banks of Loch Ness. The latter, in particular, which is a most lovely plant, is by no means rare in the Highlands, and it attains as large a size as the common cherry.

Prunus spinosa. Blackthorn or Sloe.—A hard, dwarfish, and very prickly shrub.

Juniperus communis. Juniper.—Common, though not so large as I have seen it in other districts, as on the banks of the Spey, where I have seen it ten feet high.

Salix. Willows.—Several species.

Lonicera Periclymenum. Honeysuckle or Woodbine.

Hedera Helix. Common Ivy.

Viburnum Opulus. Guelder Rose.—This beautiful shrub occurs not uncommonly on the banks of the Ness, and other neighbouring streams. It grows generally close by the Bird Cherry and Hazel.

Rosa canina. Dog Rose.—Both varieties, the white and red, here attain the height of seven to ten feet. It stands either in straight, detached bushes, or extends its long thorny branches among those of the Ivy and Woodbine.

Rosa spinosissima. The Burnet, or true Scotch Rose.—An elegant and hardy little plant, its tempting beauty generally waving in long horizontal festoons, on the most inaccessible rocks. Nothing can be more delightful than the coast ride from Inverness, through Ross to Sutherlandshire, in the month of June; almost all the banks on the road-side being literally covered with the white flowers of this dwarfish rose.

Rosa tomentosa and villosa.—Not very common.

Ribes rubrum, and R. Grossularia. The Currant and Gooseberry.—I cannot determine whether the seeds of

these were native, or brought here by birds. Both of them certainly do occur in this quarter.

Rubus Chamæmorus. Cloudberry.—Not uncommon on the higher hills. To sportsmen a delicious fruit.

Rubus idæus. Raspberry.—Every one knows this, and the following species, to be very prominent in the list of Highland delicacies.

Rubus fruticosus. Common Bramble.

Rubus suberectus. Red-fruited Bramble.

Tormentilla officinalis, and reptans. Both common.

Potentilla anserina. Silver Weed.

Geum urbanum and rivale. Avens.

Fragaria vesca. Wood Strawberry.

Fragaria sterilis. Barren Strawberry.

Alchemilla vulgaris. Lady's Mantle.

Stellaria Holostea. Greater Stitchwort.

Asperula odorata. Woodruff.—In some places extremely common.

Prunella vulgaris. Self-heal.

Primula vulgaris. The only species of Primrose we seem to have here.

Lysimachia nemorum. Yellow Pimpernel.

Mercurialis perennis. Dog's Mercury.—Rank and common.

Paris quadrifolia. Herb Paris.—This delicate, and rather rare species, occurs in several patches, especially in the islands of the River Ness. It is, for the most part, mixed with, and growing under, the Dog's Mercury.

Stachys sylvatica. Hedge Woundwort.

Bunium flexuosum. Earth Nut.

Scilla nutans, or Hyacinthus non-scriptus. Harebell.

Circæa lutetiana. } Enchanter's Night-shade.—Both
Circæa alpina. } beautiful; not very uncommon.

Melampyrum sylvaticum. Cow Wheat.

Fumaria officinalis. Fumitory.

Fumaria claviculata. Climbing Fumitory.—One of the most delicate, though not the rarest of our creepers.

Vicia sylvatica. Wood Vetch.—Not very rare, growing in fine pendant clusters, at the foot of trees or on rocks.

Viola canina, lutea, and tricolor. Violets—All common.

Ranunculus acris, bulbosus, auricomus, and Flammula.

Trollius europæus.—Globe-flower, or Lucken-gowan. In a few wet copses, extremely abundant.

Anemone nemorosa. Wood Anemone.—Very common.

Rumex acetosa and Acetosella. Sorrel.—Very common.

Oxyria reniformis, formerly *Rumex digynus.*—This is the plant so conducive to the health of mariners after a long voyage. It is sub-alpine, found among rocks, and not uncommon with us.

Sanicula europæa. Wood Sanicle.

Agrimonia Eupatoria. Agrimony.—Vale of Urquhart.

Geranium Robertianum. Herb Robert.

Geranium molle. Dove's-foot Crane's-bill.

Geranium sylvaticum. Wood Crane's-bill.—Whenever this plant does occur it is generally in great quantities, as at the Fall of Foyers.

Geranium sanguineum. Bloody Crane's-bill.—Rather rare.

Geranium lucidum. Shining Crane's-bill.—On shaded crevices in the rocks, but not common.

Parnassia palustris. Grass of Parnassus.—Common.

Saxifraga granulata. White Saxifrage.—Of a large size, and not unfrequent on the mossy banks and wet rocks of the Highlands.

Saxifraga aizoides. Yellow Saxifrage.—Very common.

Saxifraga hypnoides. Hypnoid Saxifrage.—On the banks at the Falls of Foyers.

Anthyllis Vulneraria. Lady's Finger.

Allium ursinum. Broad-leaved Garlic.—Abundant below the larger Fall of Foyers.

Alchemilla alpina. Alpine Lady's Mantle.—Also abundant below the larger Fall of Foyers.

Rhodiola rosea. Rose Root.—Nourished abundantly by the spray of the fall.

Serratula tinctoria. Saw-wort.—Abundant at the Falls.

Serratula alpina.

Bellis perennis. Common Daisy.—Everywhere.

Digitalis purpurea. Foxglove.—Both red and white occur in this quarter. Of herbaceous plants this is one of the largest and stateliest, and its flowering seems to me to indicate that summer has attained its greatest height and strength.

Juncus sylvaticus and pilosus. Woodrush.

Gramineæ.—Many of the common genera and species.

Linnæa borealis.—I cannot close this section with a plant more proper, or more peculiar to it, than the Linnæa. It occurs beneath the shade, and creeping along the roots, of the planted Fir-woods about Inverness, in the same situation in Morayshire, and in the Brahan Woods, Ross-shire.

II.—Plants found in Heaths and open Pastures.

Calluna vulgaris. Common Ling or Heather.

Erica cinerea. Fine Leaved Heath.

Erica Tetralix. Cross Leaved or Large-globe Heath.—These three are well known to give the chief character to our Highland hills and moors, and whatever that character may be at other seasons, in the beginning of autumn it is certainly a glowing and lively one. All the country seems then to wave with sheets of purple.

Empetrum nigrum. Black Crowberry.—A very constant attendant of Heather, and one of the earliest that comes out in spring.

Myrica Gale. Scotch Myrtle.—Used for many singular purposes, as decoctions, and for driving away fleas, &c., which are said not to be capable of enduring its pungent smell.

Vaccinium Myrtillus. Bleaberry.

Vaccinium Vitis Idæa. Red Whortleberry.

Vaccinium Oxycoccus is not the true Cranberry of the Highlands, but Vaccinium Vitis Idæa.

Vaccinium uliginosum. Great Bilberry.

Arbutus Uva-ursi. Bearberries.—The Bleaberries and these last three species are the boast and the greatest ornaments of our Alpine heaths. Nothing can be more beautiful than the delicacy of their tints of colour, the exquisite grace either of their prostrate or drooping flowering bells in the opening of the year, or the richness of some of their round mellow fruits when autumn draws nigh.

Pyrola minor. Less Winter Green.

Pyrola media. Intermediate Winter Green.—When these do occur, I have in general noticed a good many specimens in the same neighbourhood, though it is seldom that they are all in flower together. I have no doubt that neither this nor the *P. rotundifolia* are so uncommon as is imagined. As a general locality in this district, I may give the heaths about the House of Foyers, and the swamps about Kingsmills, Inverness, for *P. rotundifolia.*

Pyrola secunda. Serrated Winter Green.—Pretty often met with on the face of steep rocks, and what is singular, I have never found it in the position usually ascribed to it, viz., under the shade of Birch trees.

Ulex europæus. Whins or Furze.—In the months of April and May the lower hills of this county, and of the Highlands in general, are literally *yellow* with the sweet scented blossoms of this and the following species; few, I dare say, who have once beheld them with this coat on, can readily forget them. This is the time when our romantic and sequestered scenes are least visited, but I have no doubt that it is when the Birch is just breaking the bud, and the Whins are in their bloom, that these scenes are in their best and purest beauty.

Spartium scoparium. Broom.

Genista anglica. Petty Whin.—An elegant and not uncommon yellow little Heath plant.

Lycopodium clavatum. Deer's Grass.—A serpentine and creeping plant. The badge of the clan M'Kenzie.

Lotus corniculatus. Bird's-foot Clover.—It is on this that the lover of the flowery lea will oftenest and most delightedly dwell, and in the Highlands he will find abundance of it. It is said to give the sweetest milk of all our natural pasture or meadow plants, and for many reasons it would be desirable to collect and diffuse its seeds.

Trifolium repens and pratense. White and Red Clover.—Both common, and it is by the flowers and green foliage of the former that the eye is often attracted to the grave of some hero who has fallen on his native heath. It is well known that where a body has been placed, the heather will not encroach on its mould for many a day,—witness the green graves on the Field of Culloden.

Medicago lupulina. Black Medick.—A lovely but common slender plant.

Thymus serpyllum. Wild Thyme.—Very abundant.

Orobus tuberosus. Heath Pea.—Not unfrequent.

Trientalis europæa. Chickweed Winter Green.—The interest attached to this most beautiful miniature of a shrub is well known. I have only to observe on it that many of the woods and open heaths in the vicinity of Inverness are quite bedecked with it.

Gnaphalium dioicum. } Cudweeds.—Both com-
Gnaphalium sylvaticum. } mon.

Epilobium palustre. Willow Herb.

Epilobium angustifolium. In two or three places.

Ajuga reptans. Common Bugle.

Euphrasia officinalis. Eye Bright.

Odontites rubra. Red Bartsia.

Rhinanthus Crista galli. Rattle.

Pedicularis palustris. Lousewort.

Pinguicula vulgaris. Butterwort.—Very common aud characteristic.

Pinguicula lusitanica is not uncommon towards the coast.

Pinguicula alpina. Not yet found here, though it occurs in Ross-shire.

Polygala vulgaris. Milkwort.—We have all tho four varieties, and they are among the earliest and most beautiful of spring flowers.

Polygonum viviparum. Alpine Bistort.—A beautiful, and, I find, highly valued species, and one by no means rare.

Galium palustre. Lady's Bed Straw.

Eriophorum vaginatum and gracile. Cotton Grasses.—Extremely abundant, and characteristic of wet marshy heaths.

III.—Orchideæ occurring in Woods and Pastures, but more frequently in the latter.

Orchis Morio. Meadow Orchis.
Orchis mascula. Early Spotted Orchis.
Orchis pyramidalis. Pyramidal Orchis.
Orchis latifolia. Marsh Orchis.
Orchis maculata. Spotted Palmate Orchis.
Gymnadenia conopsea (*O. conopsea*). Fragrant Orchis.
Habenaria viridis. Green Habenaria.
Habenaria albida. White Habenaria.
Habenaria bifolia (*O. bifolia*). Butterfly Habenaria.
Listera cordata. Heart-leaved Twayblade.—As a general locality, I may say that most of these occur within two miles of the Falls of Foyers, and from thence towards Boleskine and the "Black Rock."

IV.—Plants found on the Margin of Loch Ness, and of the Rivers running into it.

Of these I shall only notice a very few characteristic ones, leaving out the Cyperaceæ, Junceæ, and Graminæ, the species of each of which too much resemble one another to constitute an individual detached appearance in the group.

Ranunculus Flammula. Spearwort.
R. aquatilis. Water Crowfoot.
R. hederaceus. Ivy-leaved Crowfoot.
Silene maritima. Bladder Campion.
Caltha palustris. Marsh Marigold.
Angelica sylvestris. Water Angelica.
Iris Pseud-Acorus. Yellow Iris.
Lobelia Dortmanna. Water Lobelia.—Not very common on this, but extremely abundant on the lakes of the west coast.
Plantago maritima. Sea Plantain.
Aquilegia vulgaris. Columbine.—This stately plant, which I have nowhere else met with in the Highlands, occurs in great quantities, and is undoubtedly native on the stony beach at the mouth of the River Foyers. Flowers both purple and white.
Campanula latifolia. Giant Bell-flower. Doubtful if native on Loch Ness, but unquestionably so on Teanassie Burn, which flows into the river Beauly.

I have now completed this general arrangement of the vegetable productions of the neighbourhood of Loch Ness. I have shown, I hope, the principal species which figure most in the general landscape, and added such of the minuter kinds as are considered rare in this quarter, or which had some peculiar beauty to recommend them. It will have been observed that I have taken no notice of our true Alpine plants, and this will be explained by remarking, that scarcely any of them occur in the immediate vicinity of the lake, or on the lower ridges, to which I restricted my examination. The depth of water in Loch Ness, which on an average is ninety fathoms, if not rather more, has no doubt a considerable influence in producing the remarkable amenity of the climate, especially along the corn and woodland region on the banks; but even far up in the lateral valleys, which branch off from the Great Glen, and especially in Glen Urquhart, the same softness of the air is observable. The cottages and inn there are favourite places of retreat to invalids, and in some of the large gardens (such as General Cameron's, at Polmaily) not only do all the ordinary culinary vegetables and fruit trees thrive, but peaches and apricots also ripen on the open wall, and the finest annuals and florists' flowers attain perfection. Hydrangeas, with the common scarlet Geraniums, and the more hardy Fuchsias, such as F. coccinea and F. Riccartoni, stand out the winter in the open border without any covering. And before some of the cottages I have seen Fuchsias and Chinese Roses in full bloom even at Christmas.

THE CULTURE OF HERBACEOUS PHLOXES.

By Mr. BARNES, Dane Croft Nurseries, Stowmarket.

THE perennial Phlox is fast approaching perfection in form, and the numerous varieties make it a very valuable addition to our summer gardens; and, although a plant of easy cultivation, it is much enhanced in beauty by a little care and attention to its management. March is the time that cuttings should be propagated to form good plants for flowering during the summer. When rooted, they should be potted, and kept gently growing till they are six inches high, at which time they require to be repotted and the top pinched out; in a short time they will form new shoots, four of the best of which should be selected and tied out, in order to form them into good plants. In May the plants will have attained sufficient size to receive their final shift, or to be planted in the beds in which they are intended to bloom. If the former, the pots should be at least 11 inches in diameter; and the compost should be two parts good loam, one part peat, and one leaf mould, with a little addition of charcoal and sand. If grown in beds, a good rich soil should be chosen, which, if not naturally rich, may be made so by adding a sufficiency of good rotten manure. The distance the plants require to bloom well is 2 feet by 18 inches apart. Phloxes are much benefited by occasional waterings with guano. I find the whites, and some of the more delicate colours, improved by a slight shade, as the whole panicle is, by that means, brought into full beauty at one time.

The only means of obtaining new varieties of the Phlox is by raising seedlings, and the present is the most suitable time to commence. The best method is to nearly fill the pots or pans in which the seed is to be sown with rough leaf mould, scatter the seeds, cover lightly, and place the same in a gentle heat. The plants, when up, may be treated in the manner directed for the cuttings, only when planted in beds, they need have but half the space recommended for the blooming plants.

The annual Phlox—of which we now possess nearly every shade, from pure white to deep crimson—is one of the most beautiful summer plants grown. The plants should be raised in the manner directed above; and as soon as they have made four leaves they should be potted off singly into small pots, placed in a gentle heat for a few days to re-establish them, and afterwards be subjected to all the air possible, as the plants must be stout and strong to give good flowers, and to remain long in blossom; but if, on the contrary, the seedlings are weak and spindling, they will never form good plants, or produce a fine bloom.

We are indebted to Messrs. Henderson for a valuable addition to this class of flowers—B. Deprissa; it is one nearly allied to the annuals, but has the desirable property of longer duration, is perfect in form, and merits a place in every collection. It is also easy of culture, and, I have no doubt, will become a general favourite.

The following selection of distinct perennial Phloxes will be found first-rate:—

Alba compacta.	Iphiginie.	Nitens.	Reine des Phlox.
Alexandrina.	Madame Frobel.	Præstans.	Triomphe de Louvain.
Eximia striata.	Madame Jacotot.	Rodigazii.	Venusta.
Exquisite.	Madame Rigot.	Rosetta.	Alba Magniflora (new).
General Lamoriciere.	Madame Jolly.		

Miscellaneous Notices.

NURSERY CALLS.

Messrs. Knight and Perry, Chelsea.—Jan. 3.—We here saw a large stock of the Perpetual Carnation, of which several varieties were blooming freely, even at this dull season of the year, and, as we were informed, with scarcely any artificial excitement. Of these Perpetual Carnations, which appear to be varieties of the tree Carnation, there are various colours,—mostly, we believe, self-colours, at least all that we saw were whole coloured flowers. Though the blossoms of these are not to be compared, for size and fullness, with the Carnations of summer, or with the richly-varied markings of the florists' Carnation, yet, during the winter season, they are invaluable to gardeners, who have to furnish a supply of cut flowers; and their fragrance is equal to that of any other Carnation.—M.

Messrs. E. G. Henderson, St. John's Wood.—Jan. 22.—Besides the Chorozema flava, figured at p. 73, and the new winter-flowered heath, figured at p. 81, we noted a variety of novelties, not yet in flower, of which we shall report further on some future occasion. Among them were some continental varieties of Epiphyllum truncatum, including salmoneum, the flowers of which are of a salmon-red, and speetabilis, which has crimson flowers tinged with violet; Centradenia floribunda, a species much more ornamental than C. rosea; Tropæolum Deckerianum, of which, according to the German figures, the flowers are scarlet, blue, and

green; Rogiera Roezlii, a cinchonaceous shrub, allied to Ixora; one of the digitate-leaved Begouias, named luxurians, having much the appearance of B. digitata, and said to be very showy; two species of Erionema—melastomaceous plants, with ornamental variegated foliage: one—E. marmorea—variegated with silver markings; the other—E. Enea—with golden variegations; a new Anguria, named Warczewiezii; Francisea grandiflora, with the habit of hydrangæformis; Puya longiflora; P. recurvata; Tillandsia carnea; Maranta rosea-lineata, and a species from Cayenne; Phrynium zebrinum; Charianthus coccineus, and many others.—M.

Messrs. J. and A. Henderson, Pine-Apple Place.—Jan. 22.—Among the more remarkable subjects here noted, were some well-bloomed small plants of Erica Sindryana—a very free-growing, winter-blooming heath, something in the way of hiemalis, but distinct and much finer. We also saw a very neat-flowered Begouia, a hybrid between manicata and hydrocotylifolia, of less delicate texture than the former, and with larger and deeper-coloured flowers, but of the same habit of growth; it is a very good addition to this favourite race, though by no means to be compared with Messrs. Henderson's B. cinnabarina, which is perhaps the finest of the genus. An Acacia—olivæfolia—was also blooming; it is a deep yellow-flowered species, and a good conservatory plant. The fine Warrea Lindeniana was just coming into bloom. In one of the stoves were some good plants of Tupa thapsoidea, which had been for some time in flower; and in the same house, the beautiful orange-coloured Æschynanthus speciosus, which has the great merit of flowering freely while in a dwarf state. Some of these we shall have to notice more in detail hereafter. In a greenhouse, in company of various Boronias, Eriostemons, and other hard-wooded plants, was a sturdy plant of the Pleroma elegans, which had grown to a very large size, and promises to be a magnificent object in the blooming season.—M.

NOTICES.

Hares-foot Fern.—In the *Gardeners' Chronicle* of last year, there is a description, in some notes on Cintra, of a magnificent group of three immense Cork trees, the whole of the larger branches of which are covered with the Hares-foot Fern, the bright green of the leaves and the light brown stems of the roots, well contrasting with the dark rugged bark, and the deep green masses of foliage; and round this group, a large Vine was climbing, wreathing the whole group with its yellow and red foliage. The writer seems to have considered this mass of vegetation the most beautiful group he had ever seen. It appears, from the second volume of the *Life of Southey*, just published, that, fifty years ago, he was equally struck with the beauty of this very group, and he gives the very same description of it, except, that he saw it in the spring, when the Vine leaves were bright green, and the old fronds of the Fern of the preceding year, were yellow. My reason, however, for calling attention to this, is principally to notice, that the Haresfoot Fern usually grown in a pot, will, if tied to a block or post, in a greenhouse or orchid-house, grow much better than in earth, and the light brown root-stocks soon cling round the posts or blocks.—*J. Woolley, Cheshunt.*

Adventitious Shoots of Cardamine latifolia.—The circumstance of adventitious shoots and buds being formed on plants, after they have sustained any serious injury, is familiar to most persons engaged in botanical or horticultural pursuits. Some species, indeed, bear such shoots every year without having been wounded. But there is a class of adventitious buds, examples of which are not so numerous: these are such as are found growing spontaneously on leaves, and presenting nothing to which the cause can be traced. M. Naudin has observed on a leaf of *Drosera intermedia*, two individuals of the same species reduced to the proportions of the smallest miniature; M. H. de Cassini has observed similar productions at the base of the leaflets of *Cardamine pratensis;* and I am enabled to add another still more remarkable. I was one day gathering plants at the foot of Carrigou, one of the Pyrenees, when a leaf of *Cardamine latifolia* was found, whose upper surface presented eight individuals of different sizes, and of the same kind as the parent. They were irregularly distributed over the leaf, from the base to the apex, but each of them sprang from a vein. On looking with a glass, I observed the smallest to be like a kind of obtuse cylinder, about a quarter of an inch in height. In the others, the cylinder was somewhat thicker, and green. But this leaf had also at the axil of the petiole an elongated bud, which, at the outside, presented a second leaf rolled up; the exterior leaf was seen first; by and by, a circle of small whitish excrescences were developed below on the tubercle at the base; they were elongated in rootlets, which, at first upright, became extended over the parent plant, and were about an inch long. These radicles were covered with a few hairs, and were of a whitish colour, while the leaf preserved the colour of the parent plant. It is not to be thought that the tubercle in question was a special organ. It was simply a base of the stem where roots escaped, as occurs in the true rhizoma, and trailing or underground stems. I placed the leaf of *C. latifolia*, which I have described, in some wet soil. By and by it perished, but at the end of a month, one of the little plants or shoots sprang up, although I had neglected it. These facts lead us to the following conclusions:—1. Leaves and branches differ generally, without doubt, in their form and position; but it is not impossible that, without any wound, the one as well as the other is capable of producing individuals similar to the parent plant; and in this the two sorts of organs seem to be confounded, a confusion which, with some Lentibularious plants, extends to all the characters. 2. As these small plants issue from the nerves of the leaf, it would appear that the productive force resides in them more than in the surrounding tissue. 3. The rootlets of these small plants were white, and yet they were exposed to the sun and air like the leaves, confirming a circumstance that has been long known—viz., that the white colour of the roots in general is not owing to their situation, but to their internal organization. 4. M. de Cassini observed shoots produced spontaneously from organs of a non-essential character, and that without any injury. On my plant, which was another and dif-

ferent species, I found a like phenomenon. It would therefore appear that plants of this genus have an organization which predisposes them to spontaneous production by the leaves. We have here a fresh proof that horticultural operations have often preceded the physiological theories concerning plants. We know, indeed, that oranges and other plants have long been produced simply by striking leaves; and, in all operations of this kind, the presence or absence of the nerves or fibre has been studied. The necessity is still confirmed by the above facts. It also explains the fact of the sap's ascending by the veins, and that without this sap, no development of the shoot could take place.—*M. de St. Hilaire, and Prof. Morren, in Ghent Annales.*

HORTICULTURAL SOCIETY.

Feb. 19.—The meeting was supplied with a variety of interesting subjects. The most remarkable was a plant of Dendrobium speciosum, shown by Mr. Duncan, gardener to the Rev. C. F. Chawner of Bletchinley, and to which, on account of its excellence, a large silver medal was awarded. This plant formed a dense mass, more than a yard in diameter, and bore upwards of three dozen of its splendid drooping racemes of whitish flowers. It had been grown in an intermediate house; and was kept nearly dry, in a cold frame, all the summer—its season of rest. Mr. Dobson, gardener to Mr. Beck, of Isleworth, sent a collection of very neatly grown orchids, to which a Knightian medal was awarded: the collection contained a plant of the pretty Cœlogyne cristata, and specimens of Oncidium unguiculatum. Messrs. Veitch, of Exeter, exhibited the Dendrobium heterocarpum, imported from Moulmein; it was said to be only a pale variety of D. aureum; the flowers are cream-coloured, with a tawny, pencilled lip, and are most deliciously scented. Messrs. Henderson, of St. John's Wood, sent Pimelea Verschaffeltiana, a promising-looking species, with narrowly elliptic glaucous leaves and white flowers; and some other plants. The new Californian Ceanothus dentatus was sent by Mr. Ingram from the Royal Garden at Frogmore; the flowers are bright blue, forming little stalked balls, and promise to render it an ornamental species; the habit of this and some allied kinds, is remarkably neat. Mr. Turner, of Slough, sent the Primula altaica, a gay spring flower, resembling a large common primrose, with pale rosy-purple flowers. A variety of interesting plants were sent from the garden of the Society.

Of florists' flowers a group of six very nice Cinerarias, for which a certificate was awarded, was sent by Mr. Dobson, gardener to Mr. Beck, of Isleworth. They consisted of Cerito, the finest yet raised for form and compact habit; Nymph, a very pretty white; Adele Villiers, tipped with rosy purple; Maid of Artois, a blue, starry flower, of no merit; Gem, badly bloomed; and Bessy, a bronze purple flower, rather remarkable. Cinerarias, Beauty of St. John's Wood, one of the best, and Cerito, were also sent from the garden of the Society. An Indian Azalea, called Howardii, was sent by Mr. Frost, of Dropmore; but it is too much like Triumphans to be of much importance.

Of fruit the supply was rather limited; but a remarkably fine bunch, weighing 4lb. 13oz., of the Black Barbarossa Grape, splendidly preserved, but badly coloured, was sent by Mr. John Bevington, gardener to M. Phillips, Esq., Stratford-on-Avon, and received a Banksian medal. This Grape is of very tolerable quality, being very sugary; and keeping better than West's St. Peters, is desirable on that account. Mr. Dunsford, market gardener, of Chingford Green, Essex, sent some small bunches of well-coloured Black Hamburgh Grapes, from Vines in pots; and, from an unknown contributor, "J. B.," were two bunches of Black Grape resembling Wilmot's Hamburgh, badly coloured, which, it was stated, had been ripe since June last. From Her Majesty's garden at Frogmore, Mr. Ingram sent a bundle of one hundred Asparagus, weighing 13lbs., remarkable for its large size and superior quality. This Asparagus was grown upon permanent beds, heated by hot-water pipes, from which grass of the same quality has been produced for some years past. Mr. Kestell, of Dropmore, sent two sets of glazed zinc and cast-iron labels for horticultural purposes. The name is printed upon the back part of the glass, and this is placed in a sunk panel on the face of the tally, resting upon an elastic substance, painted of any desirable colour, and pressed so close as to expel and exclude the air, thereby preventing corrosion, the principal fault of the glazed labels at present in use.

NEW AND RARE PLANTS.

Berberis Jamiesoni, *Veitch.* Jamieson's Berberry. (*Journ. Hort. Soc.*, v., S.)—Nat. Ord., Berberaceæ, § Berberideæ.—Syn., B. glauca, *Benth.*—A beautiful evergreen shrub, scarcely hardy. The leaves are oblong, nearly three inches long, with a spiny point, and a few spiny marginal teeth, deep shining green, and growing in clusters. The flowers grow in close, somewhat erect, panicled racemes.—From Peru and New Grenada; introduced, in 1845, by Dr. Jamieson. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter; and Mr. Glendinning, of Chiswick.

Berberis tinctoria, *Lesehenault.* Dyer's Berberry. (*Journ. Hort. Soc.*, v., 13.)—Nat. Ord., Berberaceæ, § Berberideæ.—A sub-evergreen slender shrub, having thin, dull-green leaves, glaucous beneath, oblong, blunt with a spiny point, but scarcely spiny-toothed; the branches bear slender, three-parted spines. The flowers grow in erect, loose racemes, scarcely longer than the leaves.—From the Neilgherry Mountains; introduced, before 1848, by the Hon. East India Company. Flowers not yet produced in England.

Berberis Lycium, *Royle.* Opthalmic Berberry. (*Journ. Hort. Soc.*, v., 14.)—Berberaceæ, § Berberideæ.—A sub-evergreen shrub, with erect branches, bearing long three-parted spines. The leaves are oblong-lanceolate, spiny-pointed, with lateral spiny teeth, or sometimes toothless. The flowers grow in long, erect, somewhat panicled racemes, much longer than the leaves; they are yellow.—From the Himalayas: elevation, 3000 to 7000 feet; introduced in ?—. Flowers in summer. Horticultural Society.

Hyacinth: Anna Maria.

HYACINTHUS ORIENTALIS, Var. Anna Maria.

Nat. Order, Liliaceæ, § Scilleæ. (Asphodeleæ, *Kunth.*)

Generic Character. — Hyacinthus. *Calyx* corollaceous, campanulate, inflated at the base, open at the throat; limb six-parted, regular, deciduous; lobes tongue-shaped or oblong, one-nerved, sub-equal, patent-recurved, longer than the tube. *Stamens*, six-equal, included; *filaments* adherent to the tube of the calyx, free at the summit; *anthers* two-celled, introrse, linear-oblong, obtuse, fixed at the back above the two-lobed base, level with the throat. *Ovary* free, sessile, sub-globose, three-celled. *Ovules* eight in a cell, in two lines, horizontal, sessile, anatropous. *Style* short, three-grooved, erect. *Stigma* three-sided, obtuse, simple. *Capsule* fleshy-spongy (membranous *Endlicher*), globosely three-lobed, three-celled, loculicidally three-valved. *Seeds* 2-5 in a cell, obliquely sub-globose, reticularly pitted, black, opaque, much thickened at the base.—(*Kunth Enumeratio.*)

Hyacinthus orientalis, *Linnæus.* Corolla funnel-shaped, half six-toothed, inflated at the base; bracts very short. (*Schultes fil.*)

Hyacinthus orientalis: var. Anna Maria.—A double-flowered Dutch florists' variety, of first-rate excellence.—A. H.

DESCRIPTION.—A handsome form of this Protean species, which is too well known to require that a detailed systematic description should be added here. The spike is more than six inches long, and closely crowded, so that the flowers form a compact mass; these are white with a slight lacing of crimson on the inner petals, and are large and beautifully regular, in the fine specimen from which our figure is taken. The great tendency to metamorphosis of the parts of the flower, gives rise to the production of the double varieties of this species even in a state of nature, and in the present example we have a most perfect instance of completeness and regularity of this change of all the floral organs into petaloid bodies. These double varieties are the more perfect in proportion as more of the reproductive organs are changed into petals, which condition, when complete, precludes the possibility of seed-bearing, while, as is well known, when seeds do occur, there is no certainty of the reproduction of the particular form. Thus it is indispensably necessary to take measures to secure a healthy state of the bulb after the flowering period, when a variety is desired to be perpetuated. The variations of colour are all accidental in this species, and are met with in the wild plant.—A. H.

History, &c.—The Hyacinth is a native of the Levant, whence it was introduced into Holland, and so improved by the Dutch Florists that they are said to have reared more than two thousand varieties of every imaginable shade of colour, single as well as double. It was cultivated in England as early as 1596, and it has been so great a favourite for many years as to have become a most important article of commerce. It may be truly said that there is no limit to the varieties, for even now that the taste of the public is so improved as to render inferior sorts of little or no value, there are hundreds of distinct recognised named kinds which are considered deserving a place in all curious collections. The colour least perfectly developed is yellow, the nearest approach to which being scarcely deeper than a sulphur colour.

Anna Maria, the variety represented in our plate, was raised in Holland, and may now be purchased in this country of every dealer in Dutch bulbs at a moderate price. It is a great favourite among florists, on account of the beauty of the plant, and the closeness of its truss of flowers, which although individually narrow-petalled and starry, as too many of them are, yet have these blemishes concealed by the reflexing of the points of the segments of the corolla. It has been chosen to represent one of the greatest excellences in a Hyacinth—namely, the size, compactness, and pyramidal outline of the truss of flowers.—G. G.

THE CULTURE AND PROPERTIES OF THE HYACINTH.

By Mr. GEORGE GLENNY, F.H.S.

WE need hardly say that the great supply of this very beautiful bulb is from Holland, and that, in a general way, they do not bloom so well the second year after importation as they do the first. This, however, has led to a conclusion, that they will not do so well in this country as in the great Dutch nurseries, or that there is something more favourable in the soil and climate of Holland than there is in that of this country—a conclusion perfectly erroneous. The Hyacinth, treated properly, in England, will grow as finely, and bloom as strongly, after seven years' cultivation, as it will in the place it came from; but nobody will take the pains. They require nursing until they are at maturity, when they will equal the Dutch roots; and, after having flowered in perfection, they will degenerate, and split into offsets, in the same way that imported roots do the second year. Seedlings raised in this country have bloomed as finely as any Dutch roots could have flowered; and, although there was no-

nothing among them that the growers in this country considered good enough for a new name, abundant proof was furnished that there is nothing in Holland that cannot be imitated nearly enough to grow any or all the bulbs fully equal to their best.

The great body of the soil in which Hyacinths are grown in Holland, is light and sandy, and, uncultivated, it is remarkably poor; but, for the growth of Hyacinths, an enormous quantity of cow-dung is required, which, when well decomposed and mixed, forms, or rather changes, the natural soil into good compost. In all the attempts that have been successful, in this country, the soil has been formed so as to secure lightness, that is to say, porosity and richness. We have seen a large collection in one-third light friable loam, one-third clean-washed sea-sand, and one-third decomposed cow-dung, and nothing could exceed the noble growth and bloom. This bed was afterwards used three seasons, to bring forward the offsets that were taken from the old roots, many of which, on taking up, had split into several, while others retained much of their original form, size, and general appearance. In the re-planting of the offsets, which took place the beginning of the next October, a fresh dressing, about two inches in thickness, of decayed cow-dung, was forked into the top six inches of soil, and the offsets were planted, as the old bulbs had been, that is, three inches below the surface. When these threw up their little spikes of flowers, perhaps not half-a-dozen pips, all but one bud was picked off. In due time, when the leaves had died down, they were all taken up, put in a dry shady place, for a few days, and then cleared of the roots and tops. These had increased in size considerably, and, at the second taking up, some were as large as the old flowering bulbs, and the next season, both in water and earth, produced full-sized trusses or spikes of flower. This, and observations on some other experiments by different persons, led to the following system of culture.

Hyacinths imported and grown in Pots.—Choose pots made on purpose, not larger than six inches across, and nearly twelve inches deep, if you can get them; if not, take thirty-two-sized pots, called six-inch pots, as the least that can be tolerated; mix half sand, and half cow-dung rotted into mould, and fill the pots within four inches of the surface; place the bulb in the centre, and press it an inch into the soil, then fill up to the top, which will cover the top of the bulb three inches; set the pots out of doors, or anywhere out of the way, till it is required to push them on. If you want a succession of bloom, and to begin early, put a few in the stove in November, a few in December, a few in January, February, and March. Being out of doors, they are well kept back; and, being covered three inches, they require no burying in the ground, or in tan, or any other medium; they must be watered occasionally, because the soil being very porous, will dry much sooner than ordinary loam and dung. The style of growth, and the size of the flowers and trusses of plants cultivated after this manner, will very much excell those cultivated in the ordinary way.

Hyacinths in Glasses.—Always use rain or river water; put them in the glasses about October, if possible; let them be in the dark until they shoot forth their fibres, and especially preserve them from frost, because, if the water be once frozen, it is almost sure to burst the glass. Change the water every six weeks; and fill up to the bottom of the root, or nearly so, any time there is a vacancy, between the periods of change. When they begin to grow, keep them in the strongest possible light, for it will prevent their drying up, and give them air if you can, as it tends to give them both strength and colour.

Hyacinths in Sand and Moss.—Hyacinths will grow and bloom in moss alone, if it be kept constantly wetted; but it is far better to half-fill any vessel you may use, such as a bowl or deep dish, or any shallow fancy vase, with silver sand wetted; place the bulb upon that, and fill the rest with good green moss. The quantity of water required, is just sufficient to keep the sand full of it, but with none laying at the top. Once, in three or four waterings, you may give liquid manure, made of a quarter of a peck of cow-dung rotted to mould, to ten gallons of water, well stirred up, and allowed to settle, the clear liquid being alone used. The effect of this is to strengthen the growth; but without any such stimulant, the plants will come short, strong, and well coloured, if kept fully exposed to the light, and well supplied with air.

Hyacinths in Beds in the Open Ground.—Choose a well-drained spot, and dig out the soil two feet deep, and four feet wide. At the bottom of this, put six inches of well decomposed cow-dung. Then mix a compost, of one-half sea-sand, well purified of its salt, and one-half cow-dung rotted into mould. If the sea-sand cannot be had, any other coarse but clean sand must be substituted. Fill up the bed with the compost, and let it settle a few days, then level it, without otherwise disturbing it, planting the bulbs six inches apart all over the bed. There will be seven in width, and the most efficient way

LB	W	LR	DB	LR	W	LB
DR	LB	W	LR	W	LB	DR
Y	DR	LB	W	LB	DR	Y
DB	Y	DR	LB	DR	Y	DB
LR	DB	Y	DR	Y	DB	LR
W	LR	DB	Y	DB	LR	W
LB	W	LR	DB	LR	W	LB
	&c.		&c.		&c.	

of disposing of the colours is indicated in the annexed arrangement. We need hardly say, that DB and DR mean dark blue and red; LB and LR, light blue and red; W, white; Y, yellow. The sorts, as well as the colours, may be varied, but always contrive so that every row may be planted in duplicate, the same on one side as on the other, of the middle flower.

The best season for planting is October, and the operation should take place in dry open weather, between the first and the middle of the month. Put fully three inches of compost above the crowns of the bulbs, and leave them to their fate. They are by no means tender, but when they begin to open and show their trusses, which in some kinds is almost as soon as they come through the ground, it would be well to cover in frosty weather with loose litter, such as peas haulm or long straw, as the buds will be damaged by sudden frosts or thaws. The period of flowering is lengthened by covering from the sun; but the roots are thereby weakened. When the bloom has faded, they are no longer interesting, and should be thrown open to all weathers. As soon as the leaves turn yellow and die down half-way, the bulbs may be lifted, and laid in by the heels for a fortnight, when they may be taken up, the leaves screwed off, the roots removed, and the bulbs put into a cool shady place for two or three weeks, after which they may be cleared of all loose skin and fibre, and the offsets, and all split roots, sorted away from the best bulbs.

Those bulbs which are handsome and full sized may be treated the same as imported varieties. The offsets and split roots may be treated in the same way as beds of full-grown bulbs for show, except that they may be closer, and the whole of each sort may be planted together, without reference to uniformity or order. When the offsets send up their small trusses of bloom, pick off all the buds but one or two at the top; when these die down, let them be treated as the roots of the show-bed. At the taking-up time, there will be found, each season, a number of full-grown handsome bulbs, to be placed among the best; and no one can possibly tell the Dutch grown from the English grown, when properly managed and in good trim. In this way, the offsets will, in due time, increase to the full size; and, every year, the bed in which they are nursed, will afford some. These beds once made, will only require trenching once a-year, and the top six or eight inches dressed with a good layer of cow-dung; that which was placed at the bottom is only turned over and left there, and the roots find their way down the whole depth every season. In Holland, the only dressing necessary is cow-dung, or, if this cannot be had, horse-dung, but it is well rotted; and a fresh dressing of this every year is necessary even in the most favourable soils and situations.

Properties of the Hyacinth.—The leading points of a perfect Hyacinth have been described, but small hopes can be entertained of ever attaining them. The new system of laying down rules for the guidance of judges, appears to have been unpopular until well understood. The principle was, to state what would make a thing perfect, even though there was no chance of reaching it, that the comparative merits of all varieties might be judged by the degree in which they approached the imaginary perfection.

The double Hyacinth, to be perfect, must have the pips, or individual flowers, round in the outline, half-round upon the face, and the petals, or divisions of the flower, should lie uniformly and symmetrical.

The truss of bloom, or spike, should be pyramidal; the foot-stalks of the lower blooms being longer than those of the upper ones, gradually becoming shorter as they rise.

The flowers should be close enough to conceal the stalk, and yet not crowded so as to disturb the round form of the individual blooms.

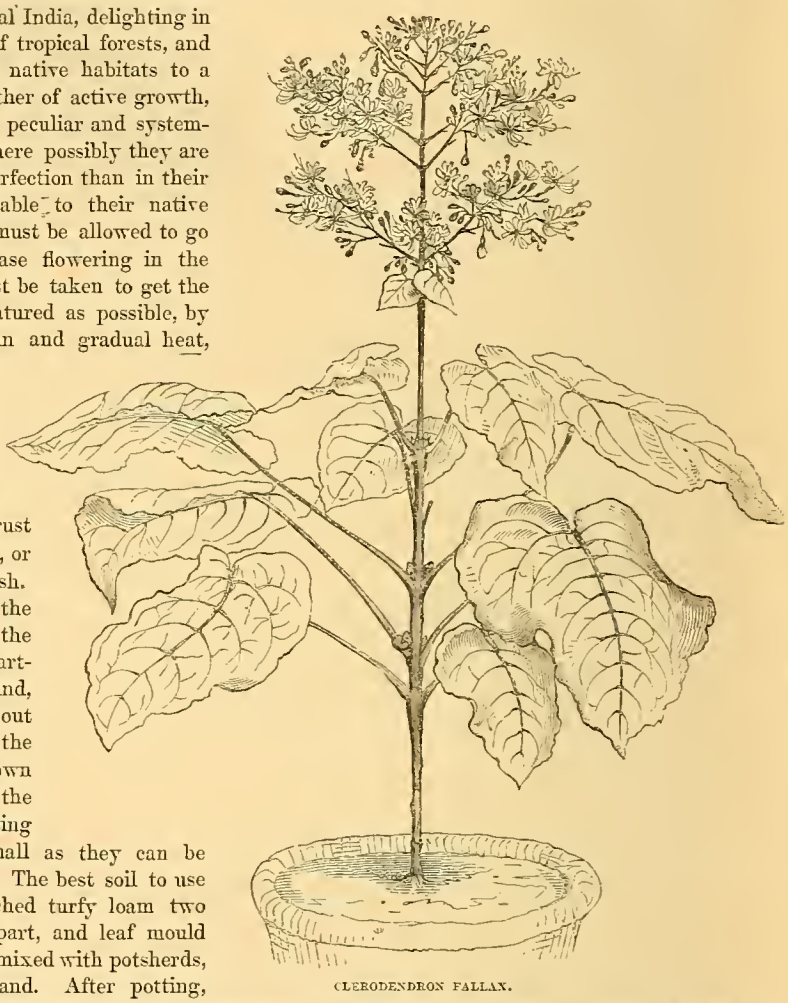
The single varieties should have the corolla reflexed enough to form a handsome face; and, in all other respects, must be as perfect as the double ones. The petals or segments of the corolla, should be wide enough to touch, and form a round outline to the entire flower.

Those who have noticed a few of the particular kinds, will observe, that Groot Voorst, Anna Maria, Lamens Korster, and some others, really possess a good many of the points of excellence; but the pyramidal form of the truss, though finely carried out, is chiefly produced by the crowding of the petals and pips.

There is but little symmetry in the blooms of the sorts that are good upon the whole; though there are some very nobly-formed pips in kinds which are too open in the truss to form a good whole. We may, by-and-bye, in a descriptive list of fifty, show the nearest approaches to what we require; or, at least, point out those particular excellences which are to be found among the extensive list of varieties at present cultivated.

THE CULTIVATION OF CLERODENDRONS.

NOT less remarkable for brilliant coloured flowers, than, when well cultivated, for rich tropical character and appearance, the genus Clerodendron certainly stands pre-eminent as "the Glory Tree" of our plant stoves and exhibition tables. Being natives of tropical India, delighting in the moist atmosphere of tropical forests, and being subject in their native habitats to a season of rest, and another of active growth, they require treatment peculiar and systematic in this country, where possibly they are yearly seen in finer perfection than in their native wilds. Agreeable to their native habits, Clerodendrons must be allowed to go to rest when they cease flowering in the autumn, and care must be taken to get the wood as thoroughly matured as possible, by exposing it to full sun and gradual heat, cautiously withholding water until the leaves are quite ripe and fall off. After this the plants may be placed in a by-corner of the stove, but do not trust them in the greenhouse, or they will probably perish.



CLERODENDRON FALLAX.

About this time, the first week in March, the first batch should be started, say two of each kind, by shaking them clean out of the soil, reducing the roots, cutting them down to the lowest bud upon the young wood, and putting them into pots as small as they can be conveniently got into. The best soil to use for them is, well-enriched turfy loam two parts, turfy peat one part, and leaf mould one part, liberally intermixed with potsherds, charcoal, and gritty sand. After potting, plunge the pots in a dung-frame, with a bottom heat of seventy-five or eighty degrees; water cautiously until the plants begin to start, but sprinkle daily, so as to induce them to break as robustly as possible. Should a number of shoots be produced, and one or two of them seem to take the lead, to the detriment of the others, it will be advisable to remove the strongest and weaker ones so as to give those of equal strength a good chance to grow. This treatment is more especially necessary with C. Kæmpferi, upon which it is always desirable to get several shoots. As the plants progress in growth, maintain a temperature of from 65 to 75 degrees, and ventilate freely every day, and through the night also, if possible, so as to promote a robust and sturdy habit. It will be necessary to keep the plants growing in the dung-frame as long as possible, and indeed, if a deep frame or dung pit, or a pit heated conjointly by hot water and dung heat, can be spared for their growth until the plants show bloom, no fear need be entertained but that they will be produced in a very superior manner.

As the plants progress in growth, they will require to be removed into larger pots, using the same compost, but substituting good rotten dung for the leaf mould after the first potting. Shift liberally, as a thoroughly good specimen cannot be grown in less than a 13 or 15-inch pot, and a plant so grown will well repay the attention devoted to it. C. paniculatum is frequently seen with a panicle of a

cockscomb form, which increases the size of the flower-head very materially. To induce this habit of growth, it is necessary to give the plant a slight check, by depriving it of bottom heat until it shows flower, and afterwards growing it very vigorously until the cockscomb character is fully developed. By this treatment, we have had the panicle of C. paniculatum upwards of three feet long; and though less brilliant in colour than some of its congeners, it is, when so grown, a noble-looking plant. Our wood-cut represents C. fallax, sometimes called affine and squamatum; but C. fallax superbum is a much finer thing, producing, instead of one, several lateral panicles; from the base of each leaf, indeed, we have had this variety with seventeen panicles of its brilliant scarlet flowers upon one plant at the same time. This variety is very scarce; but those who go to the trouble of hunting it out, will not regret their outlay in procuring it.

C. splendens, a climbing species, is a beautiful thing, either as a pot plant or as a stove climber, where, planted at a corner of the tan or tan-bed, it will grow and produce flowers in great abundance. As a pot plant, it requires to be well pruned in after blooming, but it must not be so closely pruned as some of the kinds, neither is it advisable to reduce the roots quite so much. Give the plant a season of rest; but after it is started, keep it vigorously growing with a brisk bottom heat. This species and C. macrophyllum bloom naturally late in the autumn and partly through the winter; and, indeed, by starting some plants about the end of May, most of the kinds may be had in bloom until Christmas, and at that season no flower can be more desirable for making bouquets. Clerodendrons delight in rich soil, and also, in the growing season, in rich manure water. This should be prepared by placing one bushel of fresh cow-dung, and the same quantity of sheep's dung, in a hogshead of soft water, taking care to mix them thoroughly, and adding one peck of soot, one peck of guano, and three or four large lumps of lime. This composition must be frequently stirred for a week before using, and then it will be necessary to use it diluted with an equal portion of clean water. Sprinkle the frame or pit with the manure water occasionally, and if it is perfectly clear and sweet, a little from a fine rose or syringe will be beneficial over the foliage of the plants.

Clerodendrons are propagated by cuttings, both of the old and young wood; C. splendens by grafting and budding upon the roots of the stronger-growing species, and several kinds by seed which is plentifully produced. In making cuttings of the old wood, it is sometimes customary, if the wood is very strong, to split each cutting longitudinally, retaining a growing bud or point upon each, and thus two plants are procured in the place of one. Put the cuttings in very sandy loam, and plunge the pots in a brisk bottom dung-heat of eighty degrees. Cuttings of the young wood must be inserted in silver sand; and it will also be necessary to cover them with a bell or hand glass, and to keep them in a moist growing temperature. When they are rooted, pot them off singly, and treat them as before directed. In raising plants from seed, sow in the usual manner early in March, and pot off singly when large enough. A strong bottom heat is necessary to induce the seed to germinate. Seedlings make excellent plants, and many of them may be bloomed in small pots, which makes them very handy for common decorative purposes.

This tribe of plants is very subject to the attacks of insects, especially of the red spider, thirp, and mealy bug. It is, therefore, necessary to keep a sharp look-out, and by copious syringing and a moist atmosphere, to keep the enemy at bay. The following are the most desirable kinds:—Clerodendron splendens, fallax, fallax superbum, paniculatum, Kæmpferi, squamatum, infortunatum, macrophyllum, fragrans flore pleno, Bethunianum. A.

Miscellaneous Notices.

Australian Plants.—While I lived in England, I used often to remark, that Australian Plants seldom looked well after the second or third year; and since I have resided among them, the reason has occurred to me, which is, that they ought to be cut down close to the ground when they begin to get ragged; and that the pruning-knife, and a mixture of wood ashes in the soil, would probably prove an effectual substitute for the triennal burnings to which they are subjected at home. Some of our shrubs never bloom in perfection till the season after the growth is burnt over. Among these is the *Nuytsia floribunda*, which looks like a blackened leafless trunk after a good bush-fire, but is covered the next year with one mass of orange flowers.—*J. Drummond, in Hook, Journ. Bot.* [This is a hint by which cultivators of hard-wooded plants may profit. Some of the finest plants seen at the great metropolitan exhibitions are the result of cutting down. Such things as Podolobiums, Daviesias, and many more of the free-growing New Holland plants, grow admirably after being thus cut down. The advantages of using charcoal in plant cultivation, is also explained by the triennial burnings.]

Oseille des neiges, a new Sorrel.—In 1836, M. Moritzi discovered, in one of the mountains of Switzerland, and

at the limit of the eternal snows, a new sorrel, which he called *Rumex nivalis*. When taken to his garden, it grew vigorously, without suffering from the change of locality; and assumed a lank form, so much so, that from the length of a few inches, which it only attained in its native habitat, it reached two or three feet in height; it lost nothing in flavour, which is agreeably acid, was almost devoid of leaves on the stem, but made up for this by the tufts of radical leaves becoming more compact, and of a livelier green than is usual with the common sorrel, being found also to be earlier than the latter, and seeming to vegetate even under the snow. It is also more delicate, and more sightly, from its fresh colour; but, as its roots penetrate little into the ground, it is liable to suffer from drought; it is, therefore, very necessary to water frequently, or place it in a situation which is naturally humid. From the peculiarities of this sorrel, it seems essentially hibernal; that is, may be grown in winter. In this respect, it is worthy of the particular attention of the horticulturist; for, however severe the winter may be, sown in the autumn, it yields a fine green vegetable during all that season; while, should any intense and continued frost check its growth, the cultivator may at least hope to find in it a culinary resource at the commencement of the spring, when other herbs scarcely begin to shoot. It furnishes a tender and agreeable dish. It is, beyond a doubt, that it may be successfully crossed with the common sorrel; the result of which, in all likelihood, would be the obtaining of varieties partaking of the qualities of both sorts, more tender and earlier than the common, and less sensible of heat than the *Oseille des neiges*.—*Ghent Annales.*

New Syrian Apricot: the Suedia Green-gage.—This variety was produced seven years ago from the stone of the sweet-kernelled Apricot of Ispahan, called "*Shuker Para*" (a bit of sugar). It bore one fruit in 1845; 30, in 1846; and, in 1847, 140 ripe fruit. It is the latest but one of the thirteen varieties of the Apricots with a sweet kernel in Suedia. It is a free-growing healthy tree, and a great bearer. Of upwards of 300 grafts and buds "worked" from it, only two or three failed. This year (1847) four of its medium-size fruit weighed $4\frac{3}{4}$ oz. (Troy), and five of the largest $8\frac{1}{2}$ oz. Four of the medium-size stones weighed only 2 drachms. They were cracked easily with the teeth. Its diminutive stone is its peculiar distinction; it is not a clingstone. It is rather conque-shaped. The colour yellowish-white one third, and dingy purplish-light-red the other two. It resembles the Elruge Nectarine, not merely in colour, but somewhat in form, and in its absolute absence of all down. It resembles likewise the Nectarine in the peculiar consistence of the skin. The skin cannot be *peeled*, but it must be well masticated while its sugary, soft, juicy pulp is in the mouth, in order to correct the excessive sweetness of the latter, because the only particles which contain acidity reside in the skin, for which reason it is often eaten preferably ten days before perfect maturity. It has great affinity to the plum by reason of its smooth skin, its small stone, of a sweetness that not merely rivals but surpasses that of the Green-gage, and more than all, of its almost absolute want of the Apricot perfume. All other sorts of sweet-kernelled Apricots have more or less a bitterish sour *after-taste*, as if the remnant of a bit of sugar-candy still lingered in your mouth. Two anomalies relating to the Suedia Green-gage Apricot are remarkable. The first may not properly be called an anomaly, if it should have been observed by scientific gardeners in the germination of other seeds; but the second is assuredly an anomaly:—1st, The kernel, although sweeter than the sweetest Almond before being sown, becomes very bitter as soon as it begins to germinate. 2nd, The fruit, when its kernel is still soft and watery, and not bigger than a large Marrowfat pea, is intensely bitter. Other sweet-kernelled Apricots that are *lusus naturæ*, and not a species like this, possess not the same peculiarity. As the extraordinary sweetness with which this fruit is endowed begins to be developed ten days before attaining to perfect maturity, it bears being transported to a considerable distance. Captain Wells averred, that when, a few years ago, he was stationed in a northern province of India, he had it annually sent to him, "packed in cotton," from the incredible distance of a month's journey by caravan! But the most interesting fact remains to be stated. It reproduces itself from seed, having a sweet kernel and all the other admirable qualities, as certainly as does any vegetable in the kitchen garden.*—*J. Barker, Esq., of Suedia, Aleppo, in Journ. Hort. Soc.*, 1847.

* This Apricot, we believe, is in the possession of Messrs. Veitch and Son, of Exeter.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR MARCH.

FLOWER-GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Now that the weather is a little milder, and the sun begins to assist in garden operations, something like growth may be anticipated. Continue to ventilate as freely as the weather will admit of, always guarding against cold cutting winds and unnecessary draughts. The house will now be gay with the plants before-mentioned, with the addition of some more Orchids, as Oncidiums, &c., and a few Oranges and Lilies of the Valley, which have been forwarded in the forcing-house. Of Orange-trees we know nothing so really beautiful and interesting as the dwarf-growing variety called the Otaheitan. We have plants at the present time not more than six inches in height—compact little bushes bearing ripe and green fruit, and flowers in abundance, yielding a perfume than which

nothing can be more delicious. We can confidently and most earnestly recommend this plant as quite a gem in its way, and sure to give satisfaction. Pay timely attention to climbers of all kinds; if not already done, let them be pruned and regulated without more delay. Maintain a temperature of 45 degrees by night, rising ten or fifteen degrees in the day-time. Syringe twice or thrice a-week on bright clear mornings, and keep a healthy growing atmosphere by sprinkling every vacant part of the house morning and evening. Camellias which have bloomed heavily, will be benefited by a copious watering of weak manure water, and Acacias will be grateful for a similar favour. At page 84 some remarks will be found upon the management of Pyramidal Pelargoniums, illustrated very tastefully by designs from the pencil of H. N. Humphreys, Esq. We would particularly direct attention to Rollison's Uniqne, as a kind admirably adapted for this style of management. The following kinds have also been recommended as likely to answer the same purpose—Forget-me-Not, Magog, Armada Superb, Miss Holford, Gigantea, Priory Queen, Orion, Nigress, Milo, Centurion, Gulielma, and Rosamond; and as forcing kinds, Admiral Napier and Surpass Admiral Napier, Washington, Alba multiflora, and Speculum Mundi.

Orangery.—Although the plants belonging to the genus Citrus are much admired in this country for the delicate scent of their flowers, and the noble appearance of the plants, it is a matter of regret that they are not more cultivated for their fruit, which, under proper management, may be grown to great perfection, as to flavour, and in size quite as large as those imported from more favoured regions. Thirty years ago, at the writer's native place, two houses were devoted to the cultivation of the Citrus family, from which the proprietor was as regularly supplied with fruit, both for dessert and confectionary purposes, as with grapes or pines from the other houses. The back wall of each house was planted with Lemons, Limes, Citrons, and Shaddocks, trained as systematically and uniformly as the most fastidious could desire, clothing the wall with noble foliage, and presenting at all seasons, but more especially in the autumn, specimens of first-class cultivation, which the best gardeners of the present day would be proud of. The centre of the house was filled with standard trees, laden with hundreds of golden fruit; and along the front border, trees were trained horizontally upon a low trellis, so that the house was clothed from side to side. All these plants were planted out in rich borders warmed, to some extent, by flues traversing their sides; and every care was taken of them throughout the year. The plants were not turned out in the summer season, to be alternately scorched and starved upon a terrace; neither were they buried in a sort of mausoleum through the winter; but every care was taken of them at all seasons; and most nobly did they repay the kindness. It is now many years since the auctioneers' hammer consigned the "favourites of our childhood's happy years" to the hands of the ruthless spoiler; but still, we cannot forget our English Orange-groves, where the fruit was none the worse for being stolen; and we recur to them here, with the hope that some of our noble patrons of horticulture will step in and rescue them from that oblivion to which, in this country, outdoor summer cultivation is fast hurrying them. During the year we shall have many chances of recurring to their cultivation; in the meantime, see that the plants are quite healthy and clean. Remove the surface soil down to the roots, and replace it with very rich compost, consisting of turfy loam, rotten dung, and leaf mould, to which a little thoroughly decomposed pigeons' dung may be added. Re-pot or re-tub any plants that require it; and give each a good soaking of water.

Flower Forcing House.—Continue to introduce fresh supplies of bulbs of various kinds, and American plants, with Lilacs, Roses, &c., and remove those showing colour to the Conservatory. Forsythia viridissima will be found an excellent forcing plant, as will also Weigela rosea, and Mr. Hartweg's Californian species of Ceanothus. Provide a succession of Indian Azaleas; some of the finer kinds may now be started, by introducing a few plants every week. Pelargoniums in this house will soon be in bloom. Give them plenty of air daily, and some manure water. Keep the temperature to 60 degrees by night, increasing from 10 to 20 degrees with sun heat. Syringe daily to generate a moist atmosphere, and guard against insects.

Reserve Pits.—As fast as the plants are introduced to the forcing-house, fill their places with Roses and other things to keep up a regular succession. Procure and pot Roses for next year's forcing, as directed in the Rose Garden, and pot also Sweet Briers, Honeysuckles, Lilacs, &c., for the same purpose. A good succession of Pinks and Carnations may also be forwarded in this pit, and the finer varieties of Sweet William will also be found excellent for forcing. Pot Tuberoses for the autumn.

Routine.—Towards the end of the month it may be necessary to shade the plants a little, and for that purpose it will be advisable to get the blinds fixed preparatory to their being wanted. It will not, however, be necessary to shade unless the day is very bright.

A.

Orchid House.—Let there be an uniform temperature kept up in this house, and no unnecessary excitement from over-heating must be permitted. When the sun shines out clear, give a little air, but avoid draughts. Keep all growing plants properly moist at the roots, but avoid at present indiscriminate watering. Keep the atmosphere moist by frequent sprinkling, as before directed; let nothing be neglected, but treat every plant as if intended for a specimen. Look well at every specimen previous to its opening its blooms, and see whether it could be improved by the aid of a little arrangement of the shoots or pseudo-bulbs. This, together with the use of nice green moss, placed upon the surface of the pot, very materially enhances the beauty of most Orchids. As regards shifting these plants, I would here observe, although they do not want repotting every year, I scarcely remember seeing a plant that had been properly shifted but showed instant signs of improved health and vigour. Upon this evidence, I say shift them as often as they seem to require it, should that even be annually. This applies equally to plants on blocks and in baskets. The proper time to do this is just as they are commencing their new growth. Great care must be taken not to injure their roots, and they must be made firm upon the soil, moss, or blocks. It is most essential that the blocks, moss, baskets, and soil, be at the same temperature as the house in which the plants are growing, in order that they receive as little check as possible.

Stove.—Now that the weather begins to assist, the temperature of this house may be increased to sixty degrees minimum and seventy degrees maximum by fire-heat, increasing ten or fifteen degrees on clear, bright days, by sun-heat. Ventilate freely at every favourable opportunity; but, as before directed, guard against draughts, especially near recently potted specimens. In watering, be guided by the weather, but avoid both drought and saturation. As the plants increase in growth, water may—indeed must—be increased also; but, as the temperance advocates say, observe the happy medium *enough*, but avoid saturation. Plants, however, when in free growth, that is, when hard at work, do not object to strong drink, and therefore a tub of liquid manure must always be ready for use. Let moderation be your rule, and avoid using it by all means, except in a very weak state. Maintain a moist grow-

ing atmosphere, by syringing the plants daily with tepid water. Sprinkle the paths, walls, and pipes, twice or thrice a-day, and sprinkle occasionally among the pots with manure water, so as to impregnate the atmosphere with a little ammonia. If the mealy-bug and other insects have not either been exterminated or materially subdued, lose not a moment in attacking them, or, depend upon it, you will not have any difficulty in finding a job after the plants get into free growth. Recollect prevention is better than cure.

Some of the plants started last month will be growing vigorously; sprinkle them daily, and, as far as convenient, assist them with a little bottom heat. Dipladenia splendens is a plant worthy of its specific designation, and two or three nice plants, potted now into a large pot in free, open soil, will make a splendid specimen for summer and autumn blooming. It requires plenty of heat. Some of the free-growing Clerodendrons will probably require shifting; Gloxinias and Achimenes, &c., started in the old soil, must be potted immediately into fresh compost. This is a good time to start some stocky plants of the various species of Ixora, giving them, if well rooted, a liberal shift, using strong turfy peat and plenty of sand and potsherds. The following are the best kinds:—I. grandiflora, javanica, crocata, Griffithsii, and alba, a neat little plant, deserving of every attention. Start a pot or two of Gloriosa superba, by shaking the tubers clean out of the old soil, and potting them into a rich light compost of peat, leaf mould, and loam, with sand and potsherds to make it quite porous. This plant requires considerable bottom heat, and, when growing freely, plenty of manure water. Some of the winter-blooming Justicias, &c., will now be getting shabby, and, consequently, may be removed to make room for more important things. Take what cuttings are required, and place the old plants in any by-corner to rest for a few weeks. This will make room, and, consequently, a fresh batch of Achimenes, &c., may be started.

Routine.—Keep plenty of soils, pots, crocks, &c., always in readiness for use, and take care that great cleanliness is observed in every quarter. Guard specially against insects of all kinds. J. G.

GREENHOUSE HARD-WOODED PLANTS.

Greenhouse plants generally are now fairly on the move. Great care must be taken to attend regularly to their wants in every respect. If there be one season for a general potting, it is certainly the month of March. To make more room in the house for the better sorts of plants, turn some of the second-rate kinds into a cold pit, or some place where they can be readily protected from frost. Make a thorough re-arrangement in the house, moving the plants from one end to the other, washing the shelves, stages, pots, &c.

Newly potted plants must be watered with care. They should be allowed to stand for a week or ten days after potting, before they are watered at all, when it should be done effectually. The pots of plants standing next to the front lights, should be shaded in strong sunshine, to prevent the sides of the pots becoming hot, and the roots being dried up. In fine, bright weather, the syringe may be used with advantage two or three times a-week; but you may easily do too much with it, for it will not do unless the weather is fine. Good specimens of hard-wooded plants are much wanted to bloom in July and August. Roellia ciliata, Burtonia violacea, Relhania speciosa, and a few others, should be shifted and encouraged; they are excellent plants if well grown to flower during summer; the different sorts of Statice are also good plants for the same purpose. The former should be potted in peat and sand, but the Statices do best in equal parts of peat, loam, and leaf mould. Epacrises, of the Impressa varieties, should be well cut back after flowering, and placed in a rather close but light situation, until they begin to break, when they must have plenty of air, and a good shift, preparatory to turning them out of doors. In potting them, use strong turfy peat mixed with plenty of sand. Eriostemons, of all sorts, are first-rate plants, and should be in every collection; they grow best in strong peat and sand, and if placed along with the Boronias in the warmest part of the house, will soon make rapid progress. Pimeleas and other free-flowering plants, if wanted to make large specimens, should have the bloom buds picked off as they appear, to induce them to make more growth.

Camellias.—Now is the time to inarch any worthless varieties with good sorts. Plants that are much "pot bound" may be shifted before they commence growing, but generally they do best potted after the growth is about half ripened. Use the syringe freely towards the end of the month, and be sure to avoid cold currents of air.

Azaleas.—Those plants potted and placed in heat last month, will require stopping and training. Keep a sharp look-out for thrips, and should these pests appear, the plants must be strongly fumigated with tobacco, and well washed with the syringe afterwards. J. F.

Heathery.—Presuming that soil, pots, &c., have been prepared as directed last month, no time must be lost in getting the specimen plants shifted with as little delay as possible. Those who have availed themselves of the West Kent pot, and have large plants to re-pot, will be able to appreciate its excellence; and those who have not used it, may regret that they were not wise in time. In shifting large plants, take care that the ball is in an uniform state of moisture, that is, neither wet nor dry; and guard also against the compost being dry at the time of using it. If the plants, more especially the free growing, are vigorous and well rooted, do not spare pot-room; but guard carefully against over-shifting the delicate kinds. Take care to drain the pots thoroughly with potsherds and charcoal broken small; but recollect Heaths are not *air plants*, and that it is possible to over-drain them. We have a strong objection to using Moss over the drainage, as, if it gets dry, it is a difficult matter to moisten it; and hence established plants frequently receive very considerable injury. In potting, take care to press the soil firm; but it is not necessary to follow the example of our forefathers, and consolidate the soil as much as if we were fixing a gate-post. After shifting, the plants must be watered; and the house should be kept rather close for a week or two, until the roots take with the new soil. Ventilate cautiously, avoiding draughts, especially of dry air, until the plants are re-established; damp the house daily, and a syringe of clean water drawn over the plants on a fine clear morning will not do them any injury. Those who are just commencing the cultivation of Heaths will find the following a nice lot of free-growing kinds to try their hands upon. When they have succeeded in understanding these, a second lot will be recommended to their notice:—

Hiemalis.	Bergiana.
Gracilis.	Hybrida.
Gracilis autumnalis.	Persoluta alba.
Linnæoides superba.	Perspicua nanna.
Sindryana.	Thompsonia.
Rubra-calyx.	Intermedia.
Transparens nova.	Gelida.
Cavendishiana.	Campanulata.
Ventricosa alba.	Prægnans coccinea.
Ventricosa coccinea minor.	Viridiflora.
Ventricosa globosa.	Juliana.
Ventricosa grandiflora.	Trossula.
Humeana.	Eweriana.
Sebana.	Vestita alba.
Regerminans.	Vestita rosea.

The preceding collection, a nice plant of each of

which may be purchased for less than 3*l*., will give a blooming plant or two every day in the year, and are just the kinds which a young gardener or amateur should take to experiment upon. Proceed with the potting of young stock; and many of the soft-wooded kinds may now be propagated. Guard cautiously against mildew.

Some of the early blooming kinds will now, if the weather prove favourable, be progressing; and, where it is wished to preserve them for the *May* exhibitions, care must be taken to retard them in time. Place them in a well-ventilated, cold pit, or behind a north wall on sunny days. Plants, especially large ones, that have not been shifted, will require to be watered copiously if they are dry; indeed, examine each plant carefully, and get them thoroughly soaked before the drying March winds tax their resources. J. F. C.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—This class of plants will now require considerable attention. Remove all decaying and superfluous leaves. Thin out all the small shoots, and tie out to admit the air freely. Pinch the hearts out of some for late flowering. When they have broken, shift them into larger pots, which will add greatly to the strength of the plants and size of the flowers. Pay great attention to watering, for on this success greatly depends. Ventilate freely every favourable opportunity, of course avoiding cold draughts at all times. Syringe occasionally on fine sunny mornings, and guard by timely fumigation against insects. Stir the surface of the soil occasionally, to admit the air freely. Keep the plants as close to the glass as possible, to prevent their drawing. Temperature fifty degrees, with a little increase by sun-heat and free ventilation.

Fancy Pelargoniums.—This class of Pelargoniums not being so hardy as the former, great care must be taken in watering them, as they are liable to shank off. Take out all the small shoots and superfluous leaves. Tie the shoots out thin, which will strengthen them, and cause them to break freely. Stop some for late blooming, and put in cuttings for autumn flowering. This class of plants will be found most desirable for decorative purposes, as they flower nearly all the year round. Temperature fifty degrees, with a little increase by sun-heat and free ventilation.

Cape Pelargoniums.—Start a few in a warm greenhouse, to mix with the other kinds, as their colours will be found most beautiful for contrast when blended with the others. When started, give them plenty of air. Water cautiously for the present.

Scarlet Pelargoniums.—These should now be potted in a good rich compost, and started in a gentle heat. The following six will be found the most useful for decorative purposes:—Tom Thumb, Queen of Summer (Henderson's), Gem (Ayres'), Cerise Unique (Gaines'), Magnum Bonum (Ambrose's), Flower of the Day (Lee's).

Cinerarias.—Look carefully to these, and pick off all decaying leaves. Ventilate freely to prevent mildew, and pay timely attention to fumigating, as they are very subject to the green fly. Sow seeds of these for autumn and winter flowering, on a slight hot-bed, in a sandy compost; cover lightly with silver sand. When up, remove them to a close, cold frame to harden, preparatory to pricking off, which must be done as soon as they are large enough to handle. Strike cuttings of the most showy kinds for the same purposes.

Calceolarias.—Those which require it should now be shifted forthwith. Thin out the leaves, and peg down the shoots, which will greatly strengthen the plants. Water cautiously, and give air freely. Sow seeds in a light, sandy compost. Cover lightly with silver sand. Place the pots in a close, cold frame, or house. When up, water carefully, as they are very susceptible of damp. Prick off, as soon as large enough, into a light, rich compost.

Routine.—Continue to make hot-beds, as recommended last month, and sow, for decorative purposes, the following annuals:—Balsams, Gomphrena globosa, Cockscombs, Egg plant, Brachycome, iberidifolia, Portulaca varieties, Clintonia pulchella, Phlox Drummondii, Thunbergias, Rhodanthe Manglesii, Primula sinensis, Schizanthus pinnatus, &c. Put in cuttings of such plants as it is desirable to have in abundance for the summer and autumn months. H. R.

FLOWER GARDEN.—OUT-DOOR DEPARTMENT.

When we plant a number of plants of one sort in a flower-bed, sufficient to cover the whole of it, we, to a certain extent, conform to what is found around us in the wide field of nature, where the various spots of the earth's surface are made bright and beautiful, from the masses of wild flowers that adorn them. But we must stop here; for, the similarity between nature's garden, wild and wide, and that of our massed flower-gardens of the present day, does not extend much farther. In the garden planted by Nature's hand, no intelligible outline of the individual masses is discernible, which go to make up the grouping in a picturesque scene, for all the trees and plants are so shaded off, or blended with one another, the small and great meeting together, and intermingling with each other, that it is difficult to tell where the one begins and the other ends. But it is not so in a geometrically massed flower-garden, where the colours of the one bed are contrasted complementary to that of the other, and where the circumference of the bed is observed, along with the colour of the mass; for then the eye reposes on the bed with satisfaction, and, as it were, terminates there, until the character of the plants has been distinctly seen. If we plant a bed with different kinds of plants, without much regard to the arrangement of their colours, or height of the plants, the eye, instead of finding any point of rest among them, will be continually trying to get beyond the limits of the bed, in consequence of the indefinite impressions it has already received; but, finding no outlet, falls back upon its first impressions, which are only of a confused and multitudinous nature. Besides, the mean and bare appearance observable between plants so distributed in a bed, is not only inconsistent with natural expression, but grievously wanting in everything like good taste.

All alterations in the grounds should cease about this time, if a finished and regular appearance is desired early in the season. Tying up of creepers and twining plants, and new stakes put to plants that require them, is also desirable to be done. Divide herbaceous plants in borders; and, if the line next the walk or grass curves occasionally in its length, show that you have had that rounded line in your mind's eye, by placing some large and striking plant near it, and then work up the smaller and less conspicuous plants to support it, contrasting the plants, of course, and imitating nature's formative principle, as seen in the clothing of the more naked things of earth.

Propagation.—Many of the Verbenas, Lobelias, and such soft-wooded things, put in as cuttings, as directed last month, will be rooted, and should be potted off, and placed in a frame where the temperature is about 55 degrees, until they get properly established in their pots, when hardening of should be attended to. Cuttings may even be taken of these with advantage to the plants; also, pot off your plants which have stood all winter in store pots; these we depend chiefly upon for our early show of flowers. Pelargoniums may be rooted in a hot-bed, inserted in silver sand, and also Salvias, Heliotropiums, Cupheas, Ageratums, Pentstemons, and many

other things of a like nature. Maurandyas, Lophospermums, Calampelises, Sollyas, and Tropæolums may also be rooted as the others, with the addition of a bell-glass over them. Tigridias, Bouvardias, and the large sorts of Lobelias should be forced on, to get the roots of the two latter divided in time.

Annuals.—Brachycome, Schizanthus, Schizopetalon, Scyphanthuse, Cobœas, Loasas, and Tropæolums, should be got forward in a hot-bed, where the heat is not powerful. Collinsia, Nemophila, Silene, Godetia, and numerous hardy annuals may be sown out of doors at once.

The following plants have been proved, and can be highly recommended for the flower-garden :—

Verbena Anna, flesh-colour, green eye.
Verbena Apollo, dark violet purple.
Verbena Chauvieri, crimson and scarlet.
Verbena Duchesse d'Aumale, pale blue.
Verbena Emperor of China, velvety crimson.
Verbena General Brea, dark crimson.
Verbena Iphigenie, pale lilac, rosy centre.
Verbeua John Salter, scarlet orange, fine flower.
Verbena Louis Napoleon Buonaparte, crimson.
Verbena Gabrielle de Vandeava, carmine and rose.
Verbena Magnificent, salmon-red.
Verbena Morphee, blue, with a white centre.
Verbena Rubens, red carmine.
Petunia Alba Magna, large white.
Petunia Semiduplex, rich crimson.
Petunia Julia, rose, and striped with crimson.
Petunia Elegantissima, dark rose pencilled.
Tropæolum Smithii, orange yellow.
Fuchsia Elegantissima, crimson and purple.
Fuchsia Gem of the West, white and violet.
Calceolaria Shankleyana, light brown.
Pentstemon azureus, bluish purple.
Scutellaria macrantha, bluish purple.
Gaillardia splendidissima, yellow and brown.
Lobelia grandiflora, marine blue, and white centre.
Œnothera prostrata, golden yellow. J. C.

Rose Garden.—Proceed with planting all hardy kinds as quickly as possible, and should there be no appearance of severe weather, the worked half-hardy kinds that have been taken up and protected during winter, may be planted out by the second week at the latest, as a few degrees of frost will do them no harm. The spring beds, intended to be planted with Tea scented, and other half-hardy varieties, on their own roots, should have the soil frequently turned over; or, if the beds are now filled with bulbs, &c., that are to be taken up, some fresh soil should be prepared for the roses, by frequently turning it. If the hardy roses are not pruned, they should be done as early in the month as possible. Where strong shoots are cut over, the covering of the surface with grafting-wax prevents a very destructive insect from laying its eggs in the pith, and, by excluding the air, causes the wound to heal over much sooner; for weak-growing roses this cannot be too highly recommended. Towards the end of this month, should the weather be open and sunny, a beetle will be very likely to be eating the buds; and, should the weather continue sunny, it will feed on the bark after it has eaten the eyes. As it feeds chiefly at night, during dry weather, it is difficult to catch it while feeding; for, upon the least unusual noise, it drops, as though dead, to the ground. By carefully moving the soil around the stem of the trees that are attacked, it may be found just under the surface, or, by laying some dry lumps of mould round the stem, with some pieces of tile on the top, the insects are sure to burrow among them. Plants that were budded last season, should now have their wild shoots cut back, leaving two eyes clear above where the buds were inserted. Cut off all wild buds about the stem, except the two above the bud, close enough to prevent others forming at the sides of those cut off; and examine the top of every stock to see if the pith has a little hole bored in it; if it has, the top must be cut off, and a grub will be found a few inches from the top; or the top of the stock may be covered with wax.

As the pruning is finished, take advantage of a dry day to stir up the ground between the plants; a broad tined digging-spud or fork is the best implement for this purpose. Leave the surface rough, and let the frost and sun pulverize it. Take off the shoots of any sorts that are wanted for grafting, and lay them under a north hedge, out of doors, to keep them as dormant as possible, for it may be the middle or end of April before the stocks are ready. Grafting in-doors may be done at any time.

Proceed with potting as early in the month as the weather will permit, for next season's forcing, and get them plunged as soon as they are done, as it injures them very much if they stand about exposed to the weather. In plunging, if no better provision is made for them, the plants would be benefited by being set on a half brick, or a flower-pot turned upside down; as soon as they are plunged, some sticks should be bent over them, so as to cover them from heavy rains and unkind weather. The best varieties for very early forcing, are the Common and Prolific Moss, Lee's Crimson Perpetual, Common Cabbage, and Crested Provence, for flowering in March, the above sorts, with Spong's, and Unique Provence, any of the Hybrid Perpetuals, such as Robin Hood, Louis Buonaparte, and Comtesse Duchatell; in fact, any of this class that have firm petals, bright colours, and the most double flowers.

Forcing House.—Continue to introduce fresh plants into the forcing house or pit, taking care to begin with a low temperature and plenty of air, at all favourable opportunities, and they must be set in a part of the house where they get the full benefit of the sun when it shines. H. M'M.

Arboretum.—It is presumed that the planting of deciduous trees in this department has been brought to a close: it only remains, therefore, to observe, that those operations, the object of which is an appearance of neatness, should be prosecuted. In planting the trees, and previous to laying down the turf, care must be taken to allow for the sinking of the soil; indeed, it is better for the trees to be planted shallow enough to allow of sufficient soil being placed around the stems of single specimens, so as to leave a permanent gentle swell, which looks infinitely better than seeing them rising up, as it were, out of a hole, and is far better for the well-doing of the trees. As in many, or, indeed, most cases, the planting of groups, or single specimens, of Coniferous plants, will be appropriately introduced into this department; and as these kinds of plants are generally turned out of pots, when the season is a little more advanced is a good time to plant them; and the present is as good a time as any to prepare the places for their reception; I do not hesitate to say, that in the well or ill performance of this operation will depend the future welfare of the trees. However favourable the soil may be for the growth of Conifers, it is necessary that it be well broken up to a good depth by trenching; and, whether for groups or single specimens, the spaces broken up should be large. For a single plant, however small at the time of planting, I recommend a space of not *less* than eight feet diameter. Draining, where necessary, is very important; and, if the sub-soil is bad, a portion of it should be removed, and fresh compost brought; and every hole should have a couple or three cart-loads of compost more than is necessary to fill it to a level, so that the tree, when planted, may stand on a gentle eminence. These trees flourish best in a deep, rich loam; but it is desirable to mix some decayed leaves with that part of the compost immediately in contact with the roots. When the time serves for planting, shake the whole of the soil from the roots, and gently disengage the fibres from each

other; then, having made a level place with a rake, place the plant on the soil, and see that the roots are laid out radiating every way from the centre stem; cover them with a little fine soil, and then water through a fine rose to settle the soil about the roots. Afterwards add more soil, so that the roots may be equally covered about three inches deep. Consolidate the soil by gentle pressure with the foot, and fasten the stem to a neat stake. Where turf is not to be laid, it will be necessary to mulch around the trees, to prevent evaporation: this will be found a far more rational plan of proceeding than the too common one of making a hole a foot deep, and plunging the ball of roots in just as it comes from the pot; and the difference of growth between the two treatments is very striking.

Shrubberies.—In this department there is little at present to remark upon. Neatness is now the prevailing object; and the operations consequent thereon, such as forking up and raking the borders, sweeping and rolling the grass, edging the walks, turning the gravel, giving a slight additional coat before rolling, will be the principal things to be attended to. It is also a good time to plant box edgings. J. C. R.

FLORISTS' FLOWERS.

There is no month in the year in which the cultivator of Florists' flowers has to be more constantly at his post than in March. Everything, at one time, seems to call for additional attention. The weather, too, so changeable—sunshine, snow-storms, frosts, and cutting winds, all of which require an untiring care—which, were it not for Flora's productions, would be an irksome task. As it is, difficulty after difficulty is surmounted, and every care is amply repaid.

Auriculas.—These must now be encouraged at all favourable opportunities. The frame in which they are growing, should be placed on bricks so as to allow a gentle current of air throughout, and, when favourable opportunities occur, the lights may be taken off, but in storms guard against drip, from broken squares or other accidents; nothing being more injurious to the bloom.

Carnations and Picotees.—See, by a careful examination, you possess all the varieties you wish to bloom, and where a doubt exists, as by weakness of the plants or otherwise, lose no time in making up the deficiency. Those bought in, to be repotted, as recommended las month.

Dahlias.—Roots of these, that were placed in heat last month, as recommended, will now be pushing. When the shoots are three or four inches long, they should be taken off, and struck in a gentle heat of either hot water tanks or hot beds. Shading must be attended to. Seed may be sown this month, either in pans, and placed in a hot-bed, or in a bed made for the purpose, as circumstances may permit. A few days will bring them up, when they will require air by degrees.

Hollyhocks.—Where these are intended to be grown for exhibition, they may now be planted about five feet apart, in a deep rich soil. As the plants from new and scarce kinds are from cuttings, they are not as strong in constitution as seedlings. A slight protection after planting, in cold storms and frosty nights, will be found of great service. Seeds may be sown which will flower during the autumn.

Pinks.—Examine these, and see what failures are occasioned by the winter, which should at once be filled up from the plants kept in pots; the beds loosened, and top-dressed with good, old, rotten manure.

Pansies.—Where these are growing under glass, they will require abundance of air and frequent waterings, and will be much benefited by gentle showers, if accompanied with warmth. Those in beds should be examined, cleaned, and secured from wind, which is as injurious as frost. Stir the soil well. Top-dress and protect by placing fir boughs, or any other material that will break the wind, without subjecting them to darkness.

Polyanthuses.—Those, in the open borders, will come into bloom during the month; and, where seedlings are grown, a slight protection is of service in bringing them out. For this purpose many ways will answer; but a very simple one, where small hand lights are at command, is to place them on pots, which will admit air, and give shelter. Seed should be sown and placed in gentle heat.

Ranunculuses.—Those still left unplanted may now be got in without loss of time, as recommended in last month's Calendar.

Tulips.—Attend to the directions given last month.

T. B.

FRUIT-GARDEN—IN-DOOR DEPARTMENT.

Pinery.—The principal crop may be expected to bloom during the present month. To have handsome, regular fruit, every bloom ought to open perfectly; consequently an atmosphere rather drier than usual should be maintained; this will involve a little extra firing and additional aëration. Look at our last month's directions for temperatures, and take advantage of sunny weather to water such as require it, whether in open beds or in pots.

Succession Pit.—When it is intended to grow a stock for planting, on the Meudon plan, in September next, beds made of dung and leaves should be prepared towards the end of the month. Place a stout, deep frame on the bed, sufficiently deep to hold ten inches of soil and the plants. As the plants advance in growth, raise the glass so as to keep them near it through the summer. Last year's suckers, planted fifteen or eighteen inches apart in these frames, will become fine plants by autumn, while the expense and trouble of management are trifling. The young stuff, intended for pot culture, should be repotted any favourable opportunity, and the bottom heat renewed. Use turfy loam and a little rotten manure. Where the plants are in the free soil, a portion of peat may be added to the loam.

Vinery.—As the first crop will now have been thinned, they will merely require the usual routine of stopping, watering, &c. Keep the temperature very steady whilst the stoning is going on. The night heat may remain within a degree or two of sixty-five, with the atmosphere healthy and pure, and only moderately moist, by no means so damp as many are in the habit of keeping it. We beg here to enter our protest against treating Vines as our good friend, Mr. Goode, would his Orchids in the growing season. Allow them to throw off their extra water in their own way—by perspiration, a thing impossible in an atmosphere loaded to saturation.

Succession Houses will require great attention. Disbudding, training, and stopping, must be performed as the Vines advance. Our last month's directions will be a sufficient guide as regards temperature. Vines now swelling their buds may be syringed frequently, but never after they have broken. By whatever mode the outside borders are warmed, care must be taken to preserve a gentle heat for some time yet.

Where fresh late grapes are required after Christmas, remove the sashes from the Vines, and shade them from the sun till May. By this plan, the St. Peter's and Muscats will not ripen till November, and will then keep fresh and plump till March, if required. J. S.

Figs.—The most essential agents for the free growth and development of the fruit of Figs are, unquestionably, full exposure of the foliage to solar influence, free access of air, humidity of climate, and an artificial temperature, somewhat lower than that which surrounds the trees when in a similar stage of growth in the open air. The excitability of vegetation under an

artificial temperature, is universally greater than when exposed to its natural climate, in consequence of the partial absence of light. And we find it the more especially so with plants deriving considerable nourishment from their foliage. The Fig tree is decidedly a subject of this description, for we find it producing abundant crops of fruit upon the poorest soils. In forcing the Fig, it is, therefore, highly essential to pay attention, in due time, to the thinning and regulating of the branches, giving heat with light, free ventilation, and maintaining a humid atmosphere. Plants in pots or tubs must never be allowed to become thoroughly dry, nor must they be excessively watered. While the fruit are swelling they will be benefited by a little liquid manure; it must, however, be weak. Take especial care by thoroughly syringing every day that the red spider does not attack the plants.

Peaches.—As soon as the fruit are fairly set, an advance in the temperature must take place, but not too suddenly. It is safer to increase the heat two or three degrees a-week until the thermometer stands at 60 degrees, than to rise at once to that heat, for the fruit are extremely liable to fall off under abrupt atmospheric changes. Search carefully for green fly, and if any are perceived, fumigate at once, but not too strongly, or the foliage will suffer, and repeat the process until the fly is destroyed. Red spider frequently attack the trees in this stage. If such be the case, syringe every morning and evening. But if the trees are clean, once a-day will be sufficient, as there is no necessity to keep the trees perpetually saturated. Partially disbud as soon as the shoots are an inch or two long. But be careful to leave plenty of foliage, or the economy of the trees will be disarranged; and, on the other hand, a confusion of branches will produce the same result. Thin the fruit as they get about the size of Peas, and again as they advance in growth; but leave a superabundance until after they are stoned. Examine the borders, and see that they do not suffer drought, and attend well to the ventilation of the house.

Strawberries.—Plants in bloom must have an abundance of light and air, or they will not set their fruit. If they are in the Peach-house or Vinery, keep them as near the front or top sashes as possible; and as they set their fruit, they may be removed to another part of the house, to swell their fruit and to give place to successional plants just coming into flower. The humid state of the atmosphere of these houses will not be suitable tothem while in blossom. It would be better, therefore, to set them in a pit exclusively appropriated to the purpose, and remove them to the forcing-houses. The temperature, while they are in flower, must not exceed 50 to 55 degrees. But as soon as the fruit are set, a gradual rise to from 60 to 70 degrees will be beneficial to them. If fine fruit are desirable, they must be thinned as soon as set, and liberally supplied with liquid manure every alternate watering. Placing them in pans will encourage them greatly. Syringe them frequently, except when in flower, and fumigate as soon as green fly infests them. Continue to introduce a successional batch of plants every fortnight. M. S.

Cucumber House.—The plants will now be making vigorous growth, if previous directions have been attended to. Strict attention must be paid to regulating the shoots, so that every leaf has its portion of light. Where the young plants have not yet reached the top of the trellis, they must be carefully tied to prevent their being displaced, by applying the syringe, which will now be necessary on every favourable opportunity, as the best means of keeping in check the various insects that delight to prey upon the cucumber plant. The plants that are now bearing fruit must have strict attention, to pick off every fruit and blossom that is not required, which gives strength and vigour to those left to swell. It is desirable to impregnate those that are left, when the bloom is fully expanded, about eleven or twelve o'clock in the day, and be careful not to sprinkle any water on the blossom so impregnated; and if the blossom closes in twelve hours after the pollen is applied, it is a sign that all is going on right. Stop at the first joint every lateral that is required, but pinch out every lateral that is not required as soon as it appears, and keep the plants thin of foliage, as they will then continue longer in a healthy, fruitful condition. When it is necessary to remove any old, large piece of wood, it is well to smear the wound over with fresh slacked lime. Keep the day temperature ten degrees higher than the night, and, if possible, keep the roots ten degrees higher than the night temperature. Air must be admitted on all favourable opportunities, but cutting winds must be avoided.

Dung Bed.—When the plants that are not yet planted out are ready, and the dung sweet by frequent turning, beds must be prepared. Where there is a scanty supply of dung, it is an excellent system to make the beds hollow by building dung-walls back and front to the width of the frame, and placing a hurdle, or any refuse wood, over the opening, placing a thin layer of dung over the top before putting the frame on. This will save one-third dung, and the bed will be sooner fit to receive the plants, as there is not any danger of burning the roots. The holes at the end must be stopped with hot dung or long litter. If there is no dung to spare to make a lining at once all round the frame, a good thatching of straw will be a good substitute to ward off wet and cold. Linings to old beds must be frequently topped up with fresh dung. If any woodlice appear, apply hot water to them. Earth up the plants as they require it, never allowing a root to remain exposed for a single hour. When they are not intended to be trained upon trellis-work, stop at every joint, and peg the shoots down as they progress.

Melons.—The soil for Melons I like a little firmer than that for Cucumbers, as they are more impatient of water. Where the early scarlet varieties are grown to produce fruit in the month of May, it will now be a good time to make sowings of the choicest and more esteemed varieties for a succession in June. The Danesbury Park, and Seymour's Golden Perfection, are said to be first-rate kinds. Prepare plenty of dung for successional beds. W. T.

FRUIT GARDEN.—OUT-DOOR DEPARTMENT.

Wall Trees.—The protection of Wall Trees will now engage the attention of those who are satisfied of its beneficial effects. After the last severe spring, which proved so extensively destructive to the blossom, and, in some situations, even to the trees themselves, few will be prepared to deny the advantage of an efficient protection. Next to glass, a temporary wood coping with moveable canvas curtains attached, decidedly affords the most effective and least objectionable protection. All screens which cannot be removed at pleasure are bad, if not altogether useless. The trees are shaded when light and rain would be of great service to them; and they cannot be looked over and washed, which is most requisite at an early period of their growth. Those who have curtains will do well to put them up immediately, and during very warm sunny days draw them before the trees for an hour or two in the middle of the day; this will in some measure retard the blossom, and consequently strengthen it. During dull warm days, the trees must have all the light and air it is possible to give them. In keen frosty weather, day as well as night, keep them covered. Secure the curtains so that the wind does not get behind them. Several admirable articles have recently ap-

peared on the subject of protecting Wall Trees, and which deserve attention.

Peach and Nectarine.—Continue to prune, nail, and wash the trees, as recommended last month. When they are finished, make the coverings available.

Apricot.—The plan of protecting the stems recommended by Mr. Bailey, at p. 47, deserves particular attention. Some years since I adopted and recommended the same plan for the protection of ornamental trees and shrubs that were somewhat tender, and I believed it to have been of great service then.

Fig.—This fruit tree requires but little pruning; occasionally an old branch may be cut out, but the young ones should remain their full length, and those not more than a foot or eighteen inches long it is not necessary to nail in; by this treatment a greater abundance of fruit is secured than when they are fastened close to the wall.

Apple and Pear.—It is scarcely worth the attention of gentlemen's gardeners to graft young stocks of fruit trees; but it frequently happens that a large thriving tree is of a worthless variety; when such is the case, head the tree down, and regraft with any required or approved variety. It is of importance to have the grafts taken from the trees before the buds begin to swell.

Filberts.—Immediately the catkins, or male blossom, begin to shed their pollen, commence pruning. The shaking of the branches will greatly assist in the fertilization of the female blossom, by distributing the pollen. The mode of pruning the filbert does not appear to be generally understood; and a calendarial article does not admit of any lengthened observations on the subject. I shall, therefore, for the present, briefly recommend them to be pruned in the same manner as currant trees, keeping the centres quite thin of branches.

Strawberry.—Runners that were planted in a nursery-bed last autumn must now be removed to where they are to remain for fruiting. A highly enriched soil is required for the plant; and, if fruit of a very large size are wanted, proceed in the following manner. Open a trench, as if for celery, half fill it with rotten dung, dig it in, and then refill the trench with the soil taken out, and plant immediately. Weed the old beds before the plants begin to grow, and if they have been growing in the same spot for several years, sow some guano over them in showery weather. My practice is to keep each plant or stool separate for two or three years, and then to allow them to cover the ground. They then produce a large quantity of fruit, which does very well for preserving. Sow seed of the Alpine in pans, for a supply of autumn fruit.

H. C. O.

KITCHEN GARDEN AND VEGETABLE FORCING.

There are such a multitude of things to be done in this department at this season of the year, even after the most favourable winters, that when so severe a one as we have just escaped occurs, spring operations become excessively pressing. Therefore, every exertion must be made to forward and complete with almost electric speed all work that has been unavoidably delayed. But endeavour as far as possible to keep all routine business in the foreground, especially sowing, planting, and protecting, for on diligently attending to these three things, much of the success in kitchen gardening depends.

Sow Asparagus thinly in drills in a light rich soil, and at the end of the month make new beds. Select strong one-year-old plants, and plant two rows in a four-foot bed, the rows a foot from each side of the bed, and the plants a foot apart in the rows. To obtain fine heads a rich soil of from three to four feet in depth is indispensable. Dig in with a three-pronged fork the manure laid on in the autumn, carefully avoiding injury to the crowns of the plants. As soon as they begin to grow, give a good watering with salt and water, about the strength of sea water. Plant Ash-leaved Kidney Potatoes about the middle of the month, upon a warm dry border fully exposed to the sun. On tenaceous soils defer planting till the latter end of the month; and I would strongly recommend the adoption of an old but excellent plan of planting in beds four feet and a half wide, with two feet alleys. Two rows are planted on the surface of the soil in each bed, and they are covered with soil from the alleys. The alleys are manured, dug, and planted with Cauliflower French Beans, or in fact any crop that will come off early enough for the planting of Celery. Plant Crown Artichokes in rows a yard and a half asunder, and a yard distant in the rows in good rich soil. Jerusalem Artichokes require a lighter soil than the former; they may be planted in rows a yard asunder, and fifteen inches, plant from plant, in any spare piece of ground. Plant successional crops of the following Peas:—Bishop's New Long-podded Dwarf, Fairbeard's Surprise, Champion of England, Burbridge's Eclipse, Hair's Dwarf Green Mammoth, Knight's Marrow, Bedman's Imperial, Queen of Dwarfs, British Queen, Thurston's Reliance, Knight's Dwarf Green Marrow. Protect those that are up with dry ashes from frost, and strain worsted over the rows where the sparrows are troublesome. Plant Dwarf Fan or Bog, and New Royal Cluster Beans. Sow Early Scarlet Horn Carrot, on a south border, slightly dressed with well-decayed manure. Sow general crops of Parsnips in rather strong soil. Sow the latter end of the month Dwarf Green Curled and New Hearting Borecole; also Atkins's Matchless, Wheeler's Imperial, Paragon, Preston's Victoria Cabbages, and Red Dutch for pickling, Early Cauliflower, Asiatic and Walcheren. Transplant Cabbage and Cauliflower plants, fill up vacancies in the autumn planted crops, and hoe or fork up the surface of the soil between the rows. Sow a bed of Brussells Sprouts, and a few pans of Brocoli on a slight heat. Hammond's Cape, Purple Cape, Green Cape, and White Cape, are the best for this batch. Sow Snow's Compact Cos, Matchless Cos, Alphange Cos, Wellington Cos, and White Cos Lettuces. Stir the surface of the soil between earlier crops, and plant those that have withstood the winter a foot apart. Sow, the first week in the month, the general crop of Onions; select, if possible, the Celery ground for this purpose, and give a moderate dressing of thoroughly decomposed manure. Tread the soil firmly prior to sowing the seed; and sow in drills an inch and a half deep, and nine inches apart. Brown and White Spanish, Deptford, Globe, James Keeping, and Tripoli, are good sorts; and the Silver-skinned for pickling, which must be sown on poor ground. Prick out Celery Plants sown last month, as soon as they are ready, in a frame of light rich earth; keep them close until they are rooted, then expose them fully in fine weather. Sow another pan or two the first of this month, and prepare a frame in an exposed situation, for the general crop at the end of the month. A bed of leaves in which the heat is declining will be the most suitable for them. When the plants are up they will grow fast enough without artificial excitement, and much stronger. Cole's Superb Dwarf Red, Ayres' Superb White, and Lion's Paw, are the best in cultivation. In sheltered situations a few French Beans may be put in late in the month, and here they must be well protected. Sow Early Scarlet Horn Carrot, on a south border, twice in the month. Raise Capsicums in a slight heat, and prick them singly into 60-size pots, in light rich soil, and they will be strong plants to turn out at the foot of a south wall in May. Tomatoes and Basil require the same treatment. Sow Chervil, Savory, Sweet Marjoram, Sorrel, and a variety of other herbs, in drills on a dry border, and make new plantations of

Thyme, Sage, Mint, and all perennial herbs. Clean, dress, and manure the old beds, and keep them as much together as possible, as order in the Kitchen Garden is the chief attraction it affords, as an object of inspection. Sow successional crops of Radishes and small Salads once a-week. Sow an abundance of Parsley, Ayre's Giant Curled, in drills a foot apart; thin the plants to the same distance in the rows with the hoe, leaving those that are the most curled. Sow Spinach between the rows of Peas, and thin to nine inches as soon as the plants get large enough to use—the round-seeded is the best for spring use. A few Early Dutch and Stone Turnips may be sown; if they do not run they will be useful. Sow Leeks in a spare bed for transplanting. Make new plantations of Rhubarb, so as to keep up a good stock for forcing, as well as for summer use. Well protect Mushroom beds that are in bearing, and make new ones, which if made in a sheltered spot will produce through the summer and autumn. As a general rule, crops of every description should be got in a fortnight or three weeks earlier on light dry soils than on heavy wet ones. Regard must be also paid to the exposure of the situation to frosts and keen winds. Manures should be got upon the ground and dug in as quickly as possible. Such a system of rotation should be devised as will admit of plants of opposite habit of growth following each other. Rhubarb, Sea-kale, and Asparagus, should occupy a separate compartment; and annual crops coming off the ground at the same time may be grown contiguous, in order that large plots of ground may become vacant at the same time. By this arrangement such operations as trenching, manuring, &c., are more expeditiously managed, and the appearance is improved. Turn the walks when necessary, trim the box-edgings, and make all neat for the season. J. C. S.

WILD FLOWERS OF MARCH.

In this month, if the weather be fine, a number of our earlier "weeds" begin to show themselves. Wet shady places are spotted with the golden stars of the Pile-wort (*Ranunculus Ficaria*); the Marsh Marigold (*Caltha palustris*) also, a near relation, is not unfrequently in flower towards the end of this month. The Daffodil (*Narcissus pseudo-Narcissus*) is now in its full glory, looking like a neglected garden plant strayed out into the woods and thickets, which, probably, is the real state of the case in many instances. The Wall-flower (*Cheiranthus Cheiri*) belongs also to the March list; and, though like the Daffodil, regarded as a very common flower, in spite of a rather unattractive appearance, asserts a good claim to notice in its powerful fragrance, and is a curious illustration of comparative independence of external conditions, maintaining its hardy existence in spots exposed to the most violent vicissitudes of heat and cold, drought and moisture. The Sweet Violet (*Viola odorata*), favourite of high and low, begins to bloom at this time; and the Hairy Violet (*Viola hirta*) a little later. The Coltsfoot (*Tussilago Farfara*) marks with its bright flowers and large dead-looking leaves the abode of barrenness, and in badly cultivated clayey districts the scenes of over-cropping. The Butter-bur (*Petasites vulgaris*) appears by ditches and rivers on richer soils. Among other noticeable plants may be mentioned the Poplars, Elms, and the Misteltoe (*Viscum album*), which the botanist must now look to for the inflorescence. A. H.

ANIMAL KINGDOM.

Ornithology.—A marked change may now be observed among the feathered tribes. If the weather is at all mild, the solitary call note of many is now turned into a song of joy at the prospect of returning spring; the clear and powerful voice of the Missel Thrush (*Turdus viscivorus*) may be heard at the break of day—he is an early riser; the Song Thrush (*Turdus musicus*) and Blackbird (*Turdus merula*), that were occasionally heard during February, are now in full song, pouring forth their delicious notes, long after most of their feathery companions have sought repose; but, though so late in retiring to rest, there is one still later, the Robin (*Erithacus rubecula*); he may be heard long after night has wrapt her sable mantle over all, chanting those sweet and peculiar notes that are so entirely his own—for I think it impossible to mistake the song of the Robin for that of any other bird. In the small plantations and hedge-rows the little tribe of Tits (*Parus*) may be seen, all activity and life; and, though not gifted with very musical voices, their call-notes are peculiar and interesting. Often, in the same locality, a low, weak note will fall upon the ear; it might be mistaken for the squeaking of a mouse; but it proceeds from that little fairy thing, the Golden Crested Wren (*Regulus auricapillus*), the smallest of our birds. They are generally seen in pairs, and their habits are easily observed, for they appear devoid of fear, pursuing their search after food within a few feet of the spectator. What a contrast between their weak note, and that of the Wren (*Troglodytes europæus*), who, mounted on some old stump, or from the centre of a bush, rattles forth his clear and hearty notes, with so much vigour, as almost to raise a doubt if such a volume of sound can proceed from so small a creature. It is during this month that gardens and orchards in the neighbourhood of woods often suffer severely amongst their early fruit trees from the ravages of the Bullfinch (*Pyrrhula vulgaris*); and though I love to hear his soft and rather melancholly whistle, and admire his fine form and chaste colouring, the truth must be told, he is a sad fellow amongst the fruit trees, stripping whole branches of every bud, the early Cherry trees receiving his marked attention.

In meadow and pasture lands, large flocks of Fieldfares (*Turdus pilaris*) may be seen; and also small droves of Redwings (*Turdus iliacus*), numbering six or seven: there is a marked difference, however, in their habits, the Fieldfares invariably keeping in the centre of the field, while the Redwings rarely leave the hedges many yards. Mild and open weather is of great importance to these birds at this time, enabling them to regain their wonted strength, which is often greatly reduced by severe weather and a scarcity of food, and which it is of importance that they should renew, preparatory to their migration.

The Larks (*Alauda arvensis*), which through the winter have been congregated in flocks, are now dispersed over the fields, cheering the husbandman at his toil with their unrivalled song; the Tit Lark (*Anthus pratensis*) may also be heard repeating his simple notes.

Among the Finch tribe (*Fringillideæ*), the Chaffinch (*Fringilla cælebs*) is the first to welcome returning spring with his few notes. It can hardly be called a song, although pleasing, from the sprightly manner in which it is delivered, and is more likely to attract attention now, than when our woods become peopled with more gifted vocalists. Indeed, all our resident birds appear affected by the change, even the chirp of the pert old Sparrow (*Passer domesticus*) sounds more musical. H. W.

Ichthyology.—Towards the end of this month, the White Bait (*Clupea alosa* of Donovan, *Clupea alba* of Yarrell) may be caught in the Thames. This celebrated and delicious little fish was, until Mr. Yarrell proved the contrary, supposed to be the young of the Shad—a strange error, since it differs materially from all other British species of Clupea, both in character and in habit. They remain in the river from the middle or end of March until September. It is generally supposed that the

White Bait is peculiar to the Thames, and the peculiar property of the London citizens. This, however, is not the case. Dr. Parnell found them, in 1837, in great quantities in the Firth of Forth, especially in the neighbourhood of Queensferry.

The Vendace (*Coregonus Willughbii*) was long supposed to be peculiar to one of the Scotch lakes; but the progress of science has given to it, like its congener the White Bait, a more extended geographical distribution. However, it has nowhere been found in Scotland, except in the beautiful castle lake of Lochmaben, near Dumfries. Besides Lochmaben, it is found, according to Linnæus, in Germany and Silesia; it is known in the Lake of Geneva, in some lakes in Wales, and in Bassenthwaite Lake in Cumberland. It was probably introduced into Lochmaben from the Continent, popular report says by Queen Mary; but more likely it owes its habitat to the luxurious monks, who once inhabited the neighbourhood. The Vendace is a far more delicate fish than the White Bait; and like it, cannot be transported from one water to another. It is a most delicious morsel, and a club of Dumfriesshire gentlemen meet every spring at Lochmaben to feast upon it. It would be well worth the trouble and expense, to any one having a lake or large pond, to attempt its introduction, of course by transporting its spawn, which is cast about the beginning of November, when the fish congregate in large shoals, frequently rising to the surface of the water, as the Common Herring does. They are very productive. The Vendace, according to Dr. Knox, feed upon microscopic *entomostraca*, or small Shell-fish, generally about 7-12ths of a line in length. Hence its extreme locality is understood, since, where the food upon which it feeds is not, the Vendace cannot be. Dr. Knox says that the food of the Vendace "consists *exclusively*" of entomostraca; this, however, we are very much inclined to doubt, since we have examined many specimens, the contents of whose stomachs were certainly uniformly alike, viz., Monoculi, belonging to the genus Cyclops; specimens of the genus Daphnia were not uncommon; but we have also found wings of dipterous insects, and very small coleopterous insects entire.

Should any of our friends wish to locate the Vendace in their lakes and ponds, we will readily put them in the way of making the attempt, and assist them to discover—presuming Dr. Knox's ideas to be correct—if the waters, in which it is proposed to naturalize them, abound with the necessary microscopic insects.

Shrimps and Lobsters.—At the approach of Spring, our readers resident on the coast may have an opportunity of observing the circumstances under which exuviation in the long-tailed, stalk-eyed crustaceans takes place, and the methods by which it is accomplished. Réaumur is our only authority upon the subject, and his observations were made on the River Cray fish (*Potamobius fluviatilis*); while Milne-Edwards has derived all his knowledge of this interesting process from the reports of others. So, then, here is scope for original observation; and, in these fertile days of discovery, it is no little matter to be able to point out a field unoccupied and unexplored. The Herring (*Clupea harengus*) comes in this month, or rather towards the end of February. We wish our space allowed us to say a few words upon the natural history of this fish, which, found in the highest northern latitudes, and as low as the south coasts of France, is a grateful and substantial meal to the poor and needy, and finds a place upon the elaborate tables of the rich—alike acceptable in the palace and in the pauper's cabin.

Now also Trouts (*Salmo fario* of Linnæus) begin to rise in the stream, and the Salmon (*Salmo salar*) to ascend the rivers. The Smelt, too, (*Osmerus eperlanus*,) a British fish, almost confined to the east and west coasts, prepare to spawn in the fresh waters before returning to the sea. Garfish (*Belone vulgaris*) leave the deep water and approach the shore. Roach (*Leuciscus rutilus*), and Dace (*L. vulgaris*) float near the surface, and afford much sport to the lover of the angle. Both species are gregarious, and swim in shoals.

But we must leave this subject, and turn to the land; here we find many animals waking from their winter sleep. Of the Cheiroptera, or *Bats*, seven species are found in Britain. Formerly these animals were supposed to migrate, but the opinion is now altogether exploded, and no doubts remain of their hybernating. Early in autumn they betake themselves, in large companies, to retired places, caves, and caverns, the hollows of trees, the roofs of houses and of churches, where they crowd together, suspended by their hinder claws, head downwards, clinging not only to the walls of their retreat but to each other, till the voice of spring bids them forth to play their part in the great scheme of creation.

The Hedgehog (*Erinaceus europæus*), whose hybernation is perhaps the most perfect of any British *fera*, now unrolls itself, and leaves its soft nest of moss and leaves, at the trunk of some hollow tree, some exposed root, or excavated rock, to seek its insect food—some Worm, Slug, or Snail, or even a Frog, Toad, or Mouse.

Moles (*Talpa europæa*).—It is in this month that we perceive the recent little hillocks of earth which the Mole throws up in constructing its under-ground galleries. It is the fashion to consider these animals as injurious to the crop, as their proceedings are disfiguring to the field or lawn they inhabit. We do not think, in this case, the popular opinion is the correct one; but that we shall not now stop to consider. We have not space, neither can we find time, to say more than a few words about its habits, which seem to have attracted but little attention, excepting by its professed destroyers; and it is to a Mole catcher, Monsieur Henrie le Court, and his work, *De la talpe, de ses mœurs, de ses habitudes, et des moyens de la détruire*, edited and published in Paris, by Cadet-de-Vaux, we are indebted for most of our knowledge upon a very interesting subject.

The Mole pairs in March, and during that month brings into operation the most remarkable of its habits. Dormant during the winter in its habitation of the preceding year, the Mole arises with the sun of spring, and prepares for the great purpose of its being. The cycle of its yearly habits run through the course of burrowing, pairing, breeding; and again the Mole immerses itself in its winter dwelling. "Beautiful example of a mechanical series of actions, excited by stimuli, which are imperceptible to any eye but that of Him who ordained all things; but which, depending not upon the volition of the animal, requires no education, and is as perfectly performed in the first year of pairing, as at any after period of its life."

The Dormouse (*Myoxus avellanarius*) now comes forth, not, however, in the fat state in which it retired to its winter quarters, but lean and spare. The Harvest Mouse (*Mus messorius*) commences to build its beautiful little nest—a roundish ball suspended on the stalks of plants, some four or five inches above the ground. There is still some uncertainty as to the hybernation of this pleasing little thing—the smallest of our British mammals—some asserting it becomes torpid only when it passes the winter under ground, and not so when it takes some corn-rick as its winter domicile.

Among the Reptiles, the Lizard (*Lacerta agilis*) awakes from its torpidity this month; its eggs may be found at the bottom of some southern wall. The Blindworm (*Anguis fragilis*), with its greyish body, and two dark-brown stripes along its back, aroused to animation, now meets us in our path. The Snake (*Natrix torquata*) is found in marshy places; and the Viper (*Vipera communis*) uncoils itself from its winter sleep. The Efts

(*Triton*) begin to play in the ponds and marshes; and Frogs (*Rana*) and Toads (*Bufo*) begin to spawn.

Thus have we enumerated the British hybernating mammiferous animals. They are few in number; but when we consider that our islands boast of but fifty-two species of mammals, and that these, including the Cetacea and the two seals (the former being entirely, and the latter chiefly, marine), leaving but thirty-four species for the land, we cannot say the proportions are small or irrelative. The lords of the creation have so overspread this favoured land, that its original animals have greatly decreased in number, while many have been altogether extirpated. J. S. B.

Entomology.—As in the two preceding months many species of insects are now to be found, which have passed through the winter in the perfect state, having been produced in the preceding summer or autumn. Such especially is the case with several species of butterflies, as the Brimstone (*Gonepteryx Rhamni*), the Tortoiseshell (*Vanessa Urticæ*), and the larger Tortoiseshell (*V. Polychloros*). These, and several others, come out from their winter quarters on fine days, and nothing is more enlivening than to see them, especially the first named species, hovering, in some warm nook of the garden, over patches of primroses; which, from the similarity of colour between the Butterfly and flower, seem to have been transformed into winged insects, and endowed with activity. Bearing in mind, also, the ancient myth which typified the soul by a Butterfly, we cannot behold these beautiful insects, thus reviving from their death-like sleep, without the best and holiest sympathies of our nature being awakened. Now, also, the Bees are called abroad by the genial increasing warmth; and now great attention must be paid to weak stocks, which ought to be liberally supplied with food at the top of their hives. Now, also, several destructive species of insects must be sought for and destroyed, or in a few weeks their numerous progeny will become a means of just punishment to the slovenly gardener. Such are the Click Beetles, the larvæ of which are known under the name of *Wire Worms;* such, also, is the Earwig, which is now often dug up from under the surface of the ground; and such are the troublesome pests, the Weevils, called *Otiorhynchus sulcatus* and *picipes*, which gnaw off the young shoots of different wall fruit-trees, as well as the roots of various succulent plants. In our entomological lists, we must, of course, confine ourselves to the species which are either obnoxious to the gardener, or of common occurrence.

By our list, it will be seen that many of the species now found are dung-feeders, penetrating the droppings of horses and cows in every direction, as well as the earth beneath them, and thus performing an important part in the economy of nature; by conducting the fertilizing fluids contained in these deposits into the bosom of the earth, to be thus fertilized at this, the fittest season of the year.

Coleoptera. *Cicindela campestris.*—In sandy places, foot-paths, heaths, &c.

Carabus violaceus.—At roots of trees, and under stones.

Carabus nemoralis.—In gardens.

Elaphrus riparius.—Moist banks.

Helobia brevicollis.—Under stones, and clods of earth.

Anchomenus prasinus.—Under stones, and in moss at foot of hedges.

Sphodrus terricola.—Under stones, and in cellars and outhouses.

Calathus melanocephalus.—Moist banks, and roots of trees.

Abax striola.—Under stones.

Omaseus nigrita.—Ditto.

Brachinus crepitans.—Ditto.

Gyrinu snatator.—Swimming on the surface of water.

Hydroporus] depressus and many other species.—In ponds, ditches, and running water.

Laccophilus minutus.—In ditto.

Elater segetis.—In banks, and under stones.

Elater nitidulus.—In sand-pits.

Staphylinus erythropterus.—Under stones, and in dung.

Staphylinus pubescens.—In ditto.

Oxytelus carinatus, and many other species of *Oxytelus*, *Tachinus*, and *Aleochara.*—In dung, or flying over it in the warm sunshine.

Tachyporus analis, and other species.—Under stones, and in moss.

Megatoma undatum.—Under bark of birch-trees.

Byrrhus pilula.—In pathways, and at roots of trees.

Hister cadaverinus, and other species of *Histeridæ.*—In dung and sandy places.

Sphæridium scarabæoides.—In dung.

Cercyon quisquilium, and numerous other species.—In ditto.

Geotrupes stercorarius.—Flying about at dusk, and in dung.

Aphodius Fossor, *fimetarius*, and other species.—In ditto.

Tenebria molitor and *obscurus.*—Larva in meal and biscuits.

Helops violaceus.—Under bark of trees.

Meloe proscarabæus.—In grassy places.

Otiorhynchus sulcatus.—In crevices and at foot of walls.

Calandra granaria.—In malt-houses.

Scolytus destructor.—Under bark of elms.

Coccinella bipunctata, and numerous species.—In hedges and banks.

Orthoptera. *Acheta campestris* (the Field Cricket).—In burrows, in stony places.

Acheta domestica (the House Cricket).—In houses, coming forth at night.

Blatta orientalis.—In kitchens and bake-houses.

Forficula auricularia.—In gardens.

Hemiptera. *Naucoris cimicoides.*—In ponds.

Ranatra linearis.—In ditto.

Corixa striata, and other species.—In ditto.

Gerris lacustris.—On surface of water.

Lepidoptera. *Vanessa Polychloros* (the large Tortoise-shell Butterfly).—Near elms, in lanes, &c.

Vanessa Atalanta (the Red Admiral, or Alderman Butterfly).—In woods and lanes.

Vanessa Urticæ (the Tortoise-shell Butterfly).—In over ditto.

Lycæna Phlæas.—In lanes and heaths.

Glœa rubricosa (the Red Chestnut Moth).—Flying nettles.

Orthosia miniosa (the Blossom Underwing Moth).—Weedy banks.

Brepha Parthenias (the Orange Underwing.)—Blossoms of willows.

Brepha Notha (the light Orange Underwing).—Ditto.

Biston prodromarius (the Dark Beauty).—Trunks of trees in woods.

Phigalia pilosaria (the Pale Brindle).—Ditto.

Hybernia stictaria (the Dotted Border).—On palings.

Hybernia Æscularia (the March Moth).—On ditto.

Eupithecia rufifasciata (the Red-barred Pug).—On trunks of poplars.

Diurnea Fagi (the March Dagger).—On trunks of trees.

Tortrix fimbriana (the Brown-bordered Tortrix).—On oaks,

Simæthis lutosa (the Early Nettle-tap).—On nettles.

Hymenoptera. *Anthophora retusa.*—In gardens and sunny banks.

Osmia cornuta.—In sandy places.

Osmia bicornis.—In ditto. I. O. W.

C.F.R. del. & lith.

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Geissomeria longiflora.

GEISSOMERIA LONGIFLORA.

Nat. Order, Acanthaceæ ? Barleriæ.

Generic Character.—Geissomeria, *Lindley*. *Calyx* five-parted, the usually herbaceous lobes imbricated, the posterior one broader. *Corolla* tubular, gradually dilated upwards, lobes of the mostly bilabiate limb short, erect, the upper two broader than the middle and inferior, the lateral rather narrower, the lower intermediate one often bearded on the disc. *Stamens* four, inserted near the base of the tube of the corolla, sub-didynamous, equalling, rarely surpassing, the corolla; *filaments* hairy at the base; *anthers* unilocular, acute at the apex and base, affixed by their keeled herbaceous backs, bearded, and connected by soft hairs at the apex. *Ovary* unguiculate, two-celled, cells two-ovulate; *Stigma* excavated. *Fruit* oval, scarcely contracted at the base, four-seeded. (Nees ab Esenbeck, *in D. C. Prod.* xi. 286.)

G. longiflora, *Lindley*.—Long-flowered Geissomeria. Stem erect, slightly pubescent upwards, marked with fine interrupted striæ; leaves lanceolate, rather attenuated at the apex, and decurrent at the base into a short petiole; uppermost sessile, wavy, glabrous above, excepting on the mid-nerve, slightly hairy on the under surface, especially on the veins; spikes axillary and terminal; bracts ovate-ciliate, the middle and upper shorter than the calyx, the lowest sometimes longer than the calyx.

Synonymy.—G. longiflora, *Lindl. Bot. Reg.* t. 1045; *D. C. Prod.* xi. 288.—Stenandrum speciosum, *N. ab Esenbeck in Mart. h. n.* 456.—Var. β. Stephanophysum attenuatum, *Mart. h. bras. No.* 179.

β. *acuta. N. ab. Esenb.* Points of the leaves acute.

Description.—A stove shrub, with an erect, round stem, downy on the upper part. Leaves opposite, lanceolate, wavy, tapering to a point, and into the short petiole, which is wanting in the upper leaves; glabrous in the upper face, excepting the hairy midrib, the lower face with a few scattered hairs more abundant on the veins, margins obscurely ciliated. Spikes axillary and terminal, leafy at the base, four-ranked, and closely imbricated. Bracts ovate, pubescent on the back, ciliated, the lower, elongated, veined, equalling, sometimes surpassing the calyx, the upper shorter than the calyx. Bracteoles ovate, acute, shorter than the calyx. Calyx of five imbricated unequal sepals; sepals linear, lanceolate, smooth, ciliated, the posterior twice as broad as the rest, concave. Corolla scarlet, tubular, velvety, with a curved, somewhat inflated tube, widening upward, the tube smooth internally; limb erect, four-toothed, the upper lobe rounded, transverse, ovate, emarginate, the rest entire, the lateral larger than the lower, which is bearded. Stamens four, nearly equal, as long as the tube, inserted near its base; filaments filiform, dilated at the base, hairy in the inside, densely villous at the base; anthers linear, two-celled, cohering by their acute hairy summits. Pollen-grains very large, cylindrical, rounded at each end, smooth, three times as long as broad. Ovarium ovate, conical, somewhat stalked, cells two-seeded; style filiform; stigma funnel-shaped, with a hairy line on each side.

History, &c.—A handsome, shrubby Brazilian plant; first raised in this country by T. C. Palmer, Esq., in 1826; and figured and described by Dr. Lindley, in the *Botanical Register* for 1827. It appears very variable in respect to the length of the spikes, the degree of acumination of the leaves, and in the pubescence,—A. H.

The generic name is derived from *geisson*, a tile, and *meris*, a part; in allusion to the manner in which the lobes of the calyx overlay each other.

Culture.—Geissomeria longiflora may be classed among neglected plants, from which position we hope the accompanying plate may assist in rescuing it; for it is of a showy character, and is, moreover, valuable for its property of flowering during the winter. It is a free-growing, soft-wooded, stove-shrub; propagating freely by means of cuttings, planted in the usual way, and placed in a mild hot-bed, or within the influence of a gentle bottom-heat. To flower it well, it should have a rich and very porous soil, such as, equal parts of loam, peat, and dung, all used in a rough lumpy state, with sand intermixed; and large-sized pots must be employed. The plants have a tendency to grow up tall and thin; and do not very readily produce a number of shoots, even if stopped back; on which account, flowering specimens should be made up of three or four plants set together in a pot. Strong, healthy, young plants raised the preceding summer, and well-established in small pots, should be selected early in March, or sooner, and potted three or four together, into an eight-inch pot. When they begin to start into growth, top all the shoots, which should not have grown more than six or eight inches high. After they have again formed new shoots, shift the plants into twelve-inch pots; and keep them growing on all the summer, in the ordinary stove temperature. They will flower in December and January; and, what is a great recommendation, they stand for a long time in flower.—M.

ON THE THEORY OF DÉDOUBLEMENT, OR DEDUPLICATION.*

THE term *dédoublement* originated, we believe, with two Montpellier botanists, of well-deserved reputation, who have paid much attention to theoretical morphology—Professor Duval, and his pupil, Professor Moquin Tandon; and was first applied to the case of floral envelopes which appear to have a tendency to separate into two layers, an inner one and an outer one, and thus to unline, as it were; which may be given as the literal meaning of the word *dédoubler*. But it has been gradually extended to all cases where any number of floral organs occupy the place normally taken by a single one. This phenomenon, which has only recently been generally comprehended, is of great importance in explaining the morphology of the flower; but we think that the mode in which it takes place, is far from being satisfactorily explained by the statement that it is always by deduplication.

In a normal regular flower, it is universally admitted that each sepal, petal, stamen, and carpel, is an axile appendage of the same morphological nature as the stem-leaf, and to which we, therefore, morphologically extend the term leaf. Therefore, in investigating the various anomalous developments which we observe in any one set of axile appendages, we must carefully compare them with analogous anomalies of the leaf in every one of its forms, from the stem-leaf to the carpel.

Ordinary stem-leaves show a very strong development of the vascular system, in the shape of petiole, ribs, and veins, and, in many instances, a great readiness to produce from it convex or scutelliform glands.†

These occur most frequently at the top of the petiole, or near the base of the limb, one or more on each side, or on the surface of the petiole or principal veins near the base of the limb. They are also found occasionally at the end of the midrib or lateral veins, or will break out irregularly at any part of the petiole, ribs, or veins. The general surface of the leaf will only produce hairs, aculei, or other appendages of the cellular tissue, except in cases of disease or monstrosity, where an extraordinary flow of sap will induce the formation of foliaceous appendages or regular buds on the margin or any part of the surface. But as these cases are as frequently further departures from what may be termed the normal state, as approaches to it, great care should always be taken in adducing them in support of morphological theories.

As we approach the flower a gradual change takes place in the leaf, and, more especially in its size; but still we have even an increased preponderance of the vascular system and its glands, in some cases the bracts being reduced to a mere stalk, with one or two large glands. But when we come to the floral envelope, a sudden change takes place, not only in their position on the axis, but in their texture; the vascular system, especially in their petals, is reduced to extreme tenuity, and the cellular tissue is proportionately more developed. Glands, in their ordinary form, become rare, or are variously deformed, assuming, frequently, very irregular shapes, and a petaloid consistence. In the leaves forming the *andrœcium*, a partial return to the system of stem-leaves takes place, inasmuch as the filament is entirely reduced to the vascular system, its glands are converted into anthers, and the cellular parenchyma is only occasionally represented in an expanded connectivum or slight membraneous expansion of the filament. The carpellary leaves have, again, a more or less developed cellular parenchyma, as well as a strong vascular system, the glands becoming sometimes prominent glanduliform stigmata, or sometimes papillose stigmatic surfaces of extreme tenuity.

Such being the close morphological analogy between the stamen and the stem-leaf, we would next observe that multiplication takes place in the latter almost universally in one place (either horizontal or, from various causes, more or less vertical), by the ramification or the separation from the base, of its ribs, each branch being more or less connected with the remainder of the leaf, or assuming the form of a distinct leaflet. Wherever a tuft of leaves occupies on the stem the place of an ordinary leaf, it is not by ramification of the leaf, but by the partial development of the axillary bud, of which the axis is not elongated.

Proceeding now, upon these grounds, to compare the modifications of the stamens to those of the stem-leaves, taking the ordinary stamen to represent the petiole (the filament), with a gland on each side of its apex (the two cells of the anther), we see these glands sometimes united into one (the one-celled anther by confluence), or reduced to one by abortion (the dimidiate anther), or sometimes really single and terminal, or increased to four or more in pairs, or two or more superposed or irregularly arranged, as in the stem-leaf glands so in the staminal anthers.‡ A split stamen, bearing one cell of

* From *Hooker's Journal of Botany, December*, 1849.

† We advert to the true glands, which always appear to be in close connexion with the vascular system—not to those vesicles of essential oil scattered through the cellular tissue, which are also designated by the name of glands.

‡ The correspondence of the anthers to the glands of leaves would receive still further confirmation, if it be true that in Cœlobogyne fertilization is effected by a viscid fluid exuded from the glands of the bracteæ.

the anther on each branch, may be compared to a bilobed leaf; the double stamen of Cruciferæ, each bearing a two-celled anther, to a bifoliolate sessile leaf; the treble stamina of Fumariaceæ to ternately digitate leaves; and all other cases of what is termed collateral deduplication may thus be referred to the ordinary ramifications of leaves, without the necessity of the creation of a new term to explain them. The so-called transverse deduplication is evidently a very different process, and, if really such as it is supposed to be, alone deserves the name of deduplication; but, being totally at a loss to find anything analogous in the ordinary stem-leaves, we have endeavoured to explain it by other more normal processes.

There is no doubt that in the case of many polyandrous flowers, such as Hypericum, several Tiliaceæ, and probably a considerable number of Mimoseæ and Swartzieæ, a number of stamens occupy the place of one; and that, in Malvaceæ, the stamens and petals together occupy that of the petals only; but might not this be better explained, by the heath-like development of a fascicle of leaves in the axillæ of the petals in Malvaceæ, and in those of the staminal leaves in other cases, the subtending leaves being represented by the sterile stamens in Luhea, and by the large outer stamens in Mollia and Swartzea.

A greater difficulty may occur in the case of Rhamneæ and Byttneriaceæ, where Dr Gray is undoubtedly right in considering the stamens as belonging to the corolline verticil; but, in this case, it appears to us quite as conformable to the ordinary course to consider the stamen as an axillary production, as to resort to a theory which has no analogy in stem leaves.

With regard to the inner appendages of the petals of Ranunculaceæ, Caryophylleæ, Sapindaceæ, and so many Gamopetalæ, upon which the theory of deduplication has been chiefly based, it appears to us that they are, in most cases, if not always, deformed glands; their gradual passage into anthers in some flowers, their position on the principal veins of the petals, and, in some cases, their real glandular nature, tending to confirm the supposition.

ON THE CULTIVATION OF THE UNDERGROUND ONION, IN DEVONSHIRE.

EVERY one who has been in Devonshire, within the last quarter of a century, will doubtless have experienced some surprise, not unmingled with gratification, at seeing the Potato Onion so generally and so well cultivated there.

This Onion is pretty extensively grown in Scotland also, and the Devonians, like their northern coadjutors, evidently take a greater share of interest in its management than is usually accorded it throughout England; so that, judging from the comparative unfrequency of its occurrence in gardens, the undoubted utility and prolificacy of the underground Onion would seem to be at a discount, or rather, not so extensively recognised as it deserves to be.

To those amateurs who may happen to be altogether unacquainted with this Onion, we will first premise, that the crop is never obtained like Onion crops in general—from seed, but is produced by the formation and multiplication of offsets or young bulbs upon the parent root, planted for the obtainment of a crop.

If it be a mistake to suppose that alliaceous vegetables can be grown on too deep, or, comparatively speaking, too rich a soil, this observation is especially applicable to the Potato Onion, for which a good deep soil of sub-tenacious, rather than of too friable a character, richly incorporated with well decomposed hot-bed manure is indispensable; and, although a soil not naturally light be the best, a thorough deep trenching and pulverization by frost will be found highly conducive to good culture.

In Devonshire, there is a great extent of rich, mellow, sandy land, partially intermingled with marl, resting on a dry sub-soil of rocky sand, and on this staple, when richly artificially manured, the Potato Onion thrives amazingly well; and, moreover, as evincing that too deep a soil could not well be selected for it, I may mention that an instance of Onion roots descending perpendicularly to the depth of six feet, or more, once came under my observation in that county, when a section of the ground whereon the crop grew was laid open, or cut down, because the crop was, for the purpose of examination, grown on the "ridge and furrow" principle.

The crop was the finest I ever saw, from which it may be inferred, that although the under-ground Onion may succeed tolerably well, on comparatively shallow ground, a good depth of soil, resting on a substratum, either naturally dry or rendered so artificially by deep draining, will be found the basis of its successful cultivation.

If the produce is wanted early a portion of south-wall border, if it can be spared for such a crop, is

to be recommended, as, by this means, the crop would undoubtedly precede in maturity, by eight or ten weeks, any other sort of Onion in cultivation—an apparently trifling circumstance, but, in reality, a matter of no slight importance, when it is considered how great desiderata are "early vegetables" for supplying families who have left their country-seats for the metropolis at an early period of the vegetable season.

If the ground has been well prepared by a substantial dressing of rotten dung, by deeply digging or trenching, and, subsequently, by repeatedly forking over, to expose the under-soil to the pulverizing effects of frost and air, it will be in a fit state for planting at any time, when the weather is open, from October to March.

There is a saying proverbial in Devonshire respecting the planting season of underground Onions—"Plant on the shortest day, and take up on the longest;" but, in reality, if the plantation be made in October, the produce may be secured much earlier. Good crops may certainly be obtained, though the planting be deferred until February, or early in March; but, as before alluded to, the maturing of the produce as early as possible being in most cases a desideratum, it will be requisite to plant correspondingly early; and, the best season for doing so, I have observed to be October or November, especially as the hardihood of this Onion renders it capable of withstanding severe winters without protection; all that is necessary to be attended to, as regards autumn planting, being to reinsert the bulbs, by pressing them down after the loosening of the ground by the action of frost; or, at most, should the winter prove extremely severe, a slight mulching of leaf-mould, or rotten dung will amply protect the newly-planted bulbs.

Previous to planting, the ground should be rendered tolerably even by levelling down with the Potato-fork; and, if a quantity of wood-ashes, charcoal dust, soot, &c., be at command, to be bestrewed on the surface, and then lightly forked in, so much the better, as the bulbs will sooner be induced to emit roots, and establish themselves in consequence.

The ground having been made pretty smooth, lines, or very shallow drills, one foot asunder, should be drawn in the longest direction, for the insertion of the bulbs, having first selected the medium-sized, and not the largest of the latter; as I have observed the former to turn out the most prolific, and to produce the finest Onions. Even very small ones attain a good size, and sometimes produce offsets also, which should be planted a foot apart, inserting them in the ground with the hand, just deep enough to leave the apex of each bulb exposed, and finishing the operation of planting, by running the Dutch hoe over the ground to erase footmarks, and lighten it up where trodden down.

As before observed, no mulching will be requisite unless the winter prove unusually severe; and no further attention be required until spring, beyond the reinsertion of the bulbs firmly into the ground, in case the frost should loosen the soil around them; but, as spring advances, and while the Onions are growing vigorously, an important operation, as inducing the production of a quantity of offsets, must be performed, namely—embrace an opportunity of the soil being in a dry state to describe a small circle round each bulb, and clear away the soil from them with the hand, so as to fully expose the bulbs, and leave them growing in the centre of a small hollow cavity.

As the occurrence of heavy rains, and frequent hoeing and scarifying the plantation, to keep down weeds, and preserve the ground in a state permeable to air and water, will probably disturb the soil, so as to partially cover up the roots again, this operation of hollowing out the ground around them must be repeated as often as it is deemed requisite.

In the Devonshire cultivation of the Potato Onion, the general practice is to earth them up like potatoes, but experience has satisfied me that not only are the clusters of bulbs equally prolific, but the Onions are individually much finer in size and quality, by adopting the contrary system of exposure; and, moreover, it is obvious, that in a dry season, liquid manure may be occasionally administered to them in these hollows most advantageously.

In keeping the bulbs clear of soil, therefore, in frequently hoeing and loosening the ground among them to destroy intruding weeds in embryo, &c., and, finally, in watering them twice or thrice a-week, both in dry and showery weather, with diluted manure water, if remarkably fine Onions are desired, will chiefly consist their management in the growing season.

One good result attending the appliance of manure in the liquid form to crops of alliaceous vegetables, is that of their being induced to vegetate with great luxuriance, and consequently to become much milder in flavour when employed for culinary purposes.

When the crop approaches maturity, the bulb-clusters should be separated, and spread thinly over the ground for a few dry days in June, when they may be assorted, tied in bunches, and suspended in a dry airy shed or loft, where, being beyond the influence of frost and damp, they will keep well until the following March, provided care has been taken to completely harden them off by re-

peated turning and exposure of their entire surface to the sun, on dry ground, or a hot gravel walk, previous to harvesting them.

Finally, so far from the Potato Onion being, as many consider, strong-flavoured and worthless to cultivate in preference to some other kinds, I have no hesitation in asserting that a luxuriant system of culture will render it a milder esculent even than the true Spanish; whilst, on the other hand, its perfect hardiness, great productiveness, and natural tendency to ripen (when planted in autumn) more than two months earlier than any other sort, should induce it to be universally esteemed by gardeners as a most valuable acquisition.—T.

DRAINAGE OF PLANTS GROWN IN POTS.*

THE general laws which regulate the vegetable economy are applicable alike to plants grown in the open ground, and to those cultivated in pots: the vegetative principle is never changed or altered, either in plants subjected to artificial treatment, or in those which may be said to occupy a more natural position. In accordance with this theory there is a trite saying, that plants, when grown in pots, should be treated in all essential particulars like those grown in the open ground, or, in other words, that the gardener should do in a pot what the farmer practises in a field; and since the system of drainage (called *egouttement* in French) effects astonishing results in agriculture, it is not unreasonable to expect similar advantages from its application to the purposes of horticulture. But the operation of draining a pot requires to be performed with a perfect understanding as to the mode in which it is likely to have a beneficial effect. When only a piece of a broken potsherd, or any other substance, is placed over the hole at the bottom of the pot which is being drained, the percolation and escape of superabundant moisture will, in all likelihood, be prevented by the pressure of the soil around it; the water will lodge at the bottom of the pot, and the roots of the plant will suffer, owing to the free circulation of air being impeded. It is, therefore, reasonable to infer that, besides the principal crock that covers the hole, other, or additional, materials are necessary. In the first place, the crock should be placed so that it does not lie *flat* over the hole; for, when lying positively flat, it is very apt to stop up the passage of the water. When the crock has been properly placed, it should be covered with a quantity of small pieces of brick, broken pots, angular stones of any kind, or similar materials; above this superstructure, which may range from an inch to two inches in depth, should be placed a layer of the same kind of materials, broken considerably smaller, so that the soil, when placed in the pot, may not choke up the interstices of the under layer, or even fill them too much in being pressed or shaken down. It is now well known that pieces of bricks, from their porous texture, act in the manner of a sponge for the azote, which is so essential to the nourishment of plants. Such substances become, in fact, by their physical action and chemical properties, an actual manure for plants. By means of them the soil in the pot is aërated, and the water passing rapidly off, the plant must, of consequence, be under the best condition to secure its health.

It may be readily conceived that if, in this under layer of drainage materials, there was placed a physical body constituted so as to operate in a three-fold manner: to retain one of the elements of the air, the most useful to vegetation; to allow the air to penetrate the mass of soil; and to facilitate the proper passage of the water from the roots;—and which, at the same time, by gradual decomposition, incessantly transmitted from below fresh nourishment to the roots—a substance possessing these advantages would certainly be the most suitable to be used in the cultivation of plants in pots. Where great progress has been made in the cultivation of the soil, we see that not only is the ground traversed with drains and properly aërated, but it is also manured with substances which, by their gradual decomposition, minister to the daily requirements of the plants grown. Are similar results not attainable with plants cultivated in pots? We cannot hazard a negative reply to such a question. Some cultivators have adopted the system of draining the pots by means of broken or crushed bones, which having the same absorbing qualities as the pieces of brick, even in a higher degree, are still more susceptible of gradual decomposition, especially after they have been treated with sulphuric acid weakened by water. The bones thus throw off or disengage a portion of ammoniacal gas, and furnish a quantity of sulphate and calcareous phosphate, all of which are essential to the nourishment of plants. Even for plants which admit only of being grown in peat, the beneficial effects of broken bones as drainage have been fully proved to be considerable and decided.

* Translated from the *Annales de la Societe Royale Botanique, &c., de Gand.*

ON THE CULTIVATION OF ERICAS.

By Mr. JOSEPH FAIRBAIRN, Nurseries, Clapham.

IN treating of a genus with five or six hundred identified species, and as many, or more, seedling varieties, as a matter of course the remarks, however brief, still necessary to be advanced, would be more conveniently published from time to time; therefore, I propose, as opportunities may allow, to give occasional papers upon the various heads of this subject.

I shall content myself, in this communication, with treating what may be termed the elementary parts of cultivation, included under the heads of Selection of Soil, Choice of Plants, and Shifting or Potting the same, as it is my wish, in the general instructions I venture to offer, and which are the result of careful observations, arising from a rather extensive experience, to be as definite as possible, confining myself to a plain, and I hope clear and explicit, demonstration of facts.

First, as to selection of proper soil,—without which every effort, however well directed, and perseveringly followed up, will prove an abortion. The best criterion with which I am acquainted is to obtain the soil from a locality where the wild Heath grows luxuriantly, taking care that it is not dug too deep; the turf certainly *not* to exceed four inches, less rather than more, as, if deeper than that, it is more than probable that the good and nutritious upper soil will become deteriorated by an admixture of inert and mischievous subsoil. The summer months are the right season to procure and store up a heap, which may safely be used after having had a summer and winter's seasoning.

The next matter of importance is the selection of healthy, dwarf-growing, robust plants, taking care to avoid anything like meagre, leggy, stunted plants, which may live for years (if life it may be called), but would only make a specimen calculated to disgust rather than delight the cultivator.

As regards the operation of preparing the soil for potting or shifting, the soil should be cut down from the heap, so as to disarrange it as little as possible, breaking the lumps well with the back of the spade, and afterwards rubbing the soil through the hands, which is far better than sifting, leaving much more of the fibrous decomposing vegetable matter in it; add to this one-fifth of good pure white sand, and well incorporate the two materials together.

Lastly, the operation of potting or shifting. Although not an advocate for what is called the "one shift system," still, to convert a plant into a handsome, well-grown specimen, in a moderately short space of time, recourse must be had to a liberal shift; and, to avoid anything that may appear indefinite, I would instance what I mean by a liberal shift. I would say, that a young plant in a sixty or four-inch sized pot may prudently be shifted into a twenty-four or nine-inch pot, taking care that plenty of potsherds are used for drainage; and in case of larger sized plants—of which I will treat in some future paper—pieces of sandstone and pebbles may be used. Care should be taken that the soil is well fixed by pressing with the fingers, in the fresh pot, all round the ball of the plant, so as to make it quite firm and close. After being set away in a cool frame or pit, let them be well watered; all this is much facilitated by placing a convex potsherd over it, and watering with a spout, leaving the water to diffuse itself equally over the whole soil, which is a means of avoiding what frequently occurs from watering with a rose,—namely, the surface only becoming moistened, while the ball remains imperviously dry.

Miscellaneous Notices.

Fish ponds.—In our Calendar, at p. 56, we said a few words on fish ponds, and now another say. In preparing a pond for localizing fishes, we should take care to deposit wooden boxes or troughs in which the spawn is to be deposited, and that done, we should withdraw, with a net, every fish from the water; and that because, if we do not destroy the parent fish, their voracious appetites will soon considerably reduce the number of their offspring. A very simple way to stock a pond, is, to procure and put into it, from other waters, the stones and plants upon which spawn has been deposited; and, in this way, fish may be brought out in a warm room. Salt-water fish can of course only be preserved in ponds communicating with the sea. We are acquainted with two in Britain—one at Logan, in Galloway, which consists of an artificial basin of salt water, thirty feet deep, and a hundred and sixty in circumference. It has been very successful; and here the gourmand, in the stormiest weather, when no boat dare venture to sea, finds his appetite supplied; and here, too, the naturalist finds food for his no less insatiate desires, by the opportunities it affords for observing and studying the habits and peculiarities of the denizens of the briny deep.

The second is at Guernsey—also artificial—and concerning which much exaggeration has found its way into journals, in papers on the naturalization of sea fish. The said pond had its formation from the following circumstances:—Some forty years since, the northern

extremity of the island was always insulated at high water, a narrow, sandy strip of valley, running N. W. and S. E. about two miles, which separated it from the east of the island, being always flooded by the sea. When Sir John Doyle was governor, he conceived the possibility of reclaiming the valley from the sea, by embankments at either extremity, which were soon effected, at a cost of about *L.*7,000—the reclaimed land being afterwards sold at a great profit. Close behind the north-western embankment, however, a salt-water pond of about an acre remained, and which was affected by the ebbing and flowing of the tide. In the progress of erecting buildings, sand was taken from its banks, and the pond increased to about three acres, in which state it came, with some adjoining land, into the possession of Mr. J. P. Arnold. The pond is in parts, six and seven feet deep; it communicates, by sluices, with the sea, and the fishermen having been requested to throw into it such live fish as were too small for the market, it now contains an abundant supply of all the species found upon the coast. Grey Mullet and Eels seem the most abundant; but there are plenty of Bream, Plaice, Brill, Soles, Skate, Turbot, Basse, and Smelts.—J. S. B.

Hybernation.—The periodic character of the phenomena of the natural world has afforded a most ample and interesting field for the speculation of the philosopher and the researches of the naturalist. Though both may have been baffled in their efforts to explain the causes of things, they have, nevertheless, established the knowledge of a series of most exciting and interesting facts. Generally, it has been more easy to interpret and explain those phenomena considered as belonging peculiarly to the inorganic kingdom, or that of dead matter; while those presented to us in the complex action and diversified functions of the living forms of matter, whether of the animal kingdom or of the more simple types of the vegetable creation, have invariably led to much difference of opinion as being necessarily veiled in much ambiguity of conception, and imperfect description.

Of the periodic manifestations of nature considered both as affecting organic and inorganic bodies, those which arise from the diurnal revolution of our globe on its axis, constituting the distinct and definite periods of day and night, are the most striking. The busy, ceaseless hum of the activity of high noon, contrasted with the deep repose of night—silence how dead!—darkness how profound!—creation sleeps!—'tis as if the general pulse of life stood still, and nature made a pause—an awful pause, prophetic of the end!

Yet this almost temporary death is restored by the morrow's dawn. And, curious as is the inquiry into the cause of this sleep, as requisite for the well-being of man, no less curious is the consideration of that winter sleep, peculiar to certain kinds of animals, and which is commonly expressed by the term Hybernation. There are comparatively few of our native mammalia which hybernate; but the phenomena of hybernation are witnessed in all the Chelonian, Saurian, Ophidian, and Batrachian animals. They also occur in some mollusc and insect groups. The length of time during which it continues is very various, ranging from four to seven, or even eight, months. It has, however, been remarked that all revive either in March or April. The Jumping Mouse of Canada (*Gerbillos canadensis*) lies rolled up in a ball of clay for a period between seven and eight months. This state of repose, or suspension, of the animal, and in a considerable degree of all the organic functions, is not identical with sleep; nor does it present invariably the same phenomena in the different animals which are capable of becoming the subjects of it. The Bat, the Dormouse, and numerous insects, awake at intervals, during which they make efforts to secure food for themselves. But, in the Hedgehog and Marmot, the winter sleep, once begun, continues unbroken either by hunger or thirst, and uninterrupted till the return of spring.

That the torpid or deep sleep which affects animals in this condition, is altogether different, at least in intensity, from ordinary diurnal repose, is clearly proved by the impossibility to excite them, by pricking, by galvanic shocks, or even by serious injury, such as fracturing their bones. Nor are they disturbed, or roused from their rest, by immersion, for a time, in gases, which, in other conditions of the system, would be immediately followed hy a fatal result.

It differs no less essentially from the mere torpor induced by cold, for this is a condition into which all animals may be brought, and which, when prolonged, ends in death; whereas, the animals which hybernate are comparatively few indeed, and their activity returns with the spring. No experiments have been made, we are led to believe, to determine what would be the effect of extreme degrees of cold applied to hybernating animals, either preceding the approach of the period of hybernation, or during that interval. The habit or disposition to it, however, may be greatly modified, as we have the testimony of Dr. Barton to the effect, that this characteristic of many species of animals of becoming torpid in Pennsylvania, and the more northern districts, subsides when they become inhabitants of the Carolinas—a proposition, which we might have been led to predict, *a priori*, from the analogies both of the animal and vegetable creation.

The state of hybernation comes on gradually, and, when perfect, there is a complete abnegation of the senses. While it lasts, the functions of respiration, circulation, digestion, nutrition, secretion, and absorption are almost completely suspended. The irritability of the muscular tissue is greatly impaired, and the temperature of the body falls nearly to that of the surrounding medium. The weight of the body is further diminished.

Though there is obviously a connection between the diminished temperature and the torpid condition of the functions in hybernation, a difficulty exists in explaining why this property occurs only in certain animals, for as yet no anatomical explanation has been advanced of sufficient weight to account for the phenomenon:—there is undoubtedly some relation to the nervous system to which we must appeal for an explanation.

At any rate, it is *not* to be considered primarily as a suspension of the function of respiration, immediately contingent on reduced temperature.—J. S. B.

Obituary.—February 10th.—Mr. Smith, gardener at Hopetoun House. Mr. Smith commenced his professional life at Ormiston Hall, in 1790, and was afterwards promoted to the charge of the gardens at that place, from whence he removed to the more extensive sphere at Hopetoun; being nearly all his life in the service of the same noble family. Mr. Smith was one of the early members of the Caledonian Horticultural Society; and one of the first professional men in Scotland admitted as a Fellow of the Horticultural Society of London. As a horticulturist, the deceased gentleman was well known, and universally respected.

NEW AND RARE PLANTS.

Limnanthes rosea, *Bentham*. Rose-coloured Limnanthes. (*Journ. Hort. Soc.*, iv., 78.)—Nat. Ord., Tropæolaceæ, § Limnantheæ.—Syn., L. pulchella, *Hartweg.*—A hardy annual plant, with prostrate branches, bearing leaves of variable form, the parts being all linear; sometimes they are quite simple, sometimes pinnately divided, and at other times cut in a bipinnate manner.

The flowers are axillary, growing singly on longish upright stalks, and consist of five obcordate petals, of a pale dull rose colour. It is not very showy, and should be grown in a dampish, cool place.—From California: swampy places in the valley of the Sacramento; introduced, in 1848, by Mr. Hartweg. Flowers in summer. Horticultural Society of London.

Calochortus pallidus, *Schultes.* Pale-flowered Calochortus.—Nat. Ord., Liliaceæ, § Tulipeæ.—A pretty, bulbous-rooted, half-hardy perennial, producing a tuft of grass-like channelled leaves, and from among them a flowering-stem six or eight inches high, supporting three or four blossoms, each on a slender peduncle; these peduncles grow in an umbellate manner from

the base of two or three small leaves, which are produced at the top of the common stem. The flowers are hexapetaloid, the three outer divisions small, ovate-oblong, obtuse; the three inner much larger, obovate, rounded at the apex, and attenuated at the base; they are pale yellowish buff colour, with a broad angular blotch of dark reddish-brown in the centre.—From Mexico; introduced to Belgium about 1844. Flowers in the latter part of summer.

Stanhopea cirrhata, *Lindley.* Cirrhate-columned Stanhopea. (*Journ. Hort. Soc.*, v., 37.)—Nat. Ord., Orchidaceæ, § Vandeæ-Maxillaridæ.—A very distinct stove epiphyte, but apparently not of much beauty. The flowers are solitary, not in spikes; the colour not known; the column is wingless, and extended into a pair of feelers.—From Nicaragua; collected by M. Warczewitz; introduced, in 1848, by G. U. Skinner, Esq. Flowers? —

Cleisostoma fuscum, *Lindley.* Fuscous Cleisostoma. (*Journ. Hort. Soc.*, v., 80).—Nat. Ord., Orchidaceæ, § Vandeæ-Sarcanthidæ.—A stove epiphyte, with oblong, distichous, leathery leaves, nine inches long, and close panicles of dingy, yellowish-brown flowers; the sepals and petals oblong; the lip yellow, three-lobed. Perhaps only a variety of *C. latifolium.*—From the East Indies; introduced in 1846. Flowers in autumn. Hon. East India Company.

Ærhmea discolor.

ÆCHMEA DISCOLOR.

Nat. Order, Bromeliaceæ.

Generic Character.—Æchmea, *Ruiz* and *Pavon.*—*Bracts* cup-shaped. *Perigone* superior, six-parted; external lobes *calycine*, equal, spirally twisted, awned or unarmed, dilated obliquely below the apex; interior lobes *petaloid*, much longer than the outer, twisted below, with scales at the base within, or more rarely naked. *Stamens* six, inserted at the bottom of the perigone; *filaments* filiform, three of them adnate to the base of the interior lobes; *anthers* ovate, fixed by the back, sub-incumbent. *Ovary* inferior, three-celled. *Ovules* numerous, pendulous from the central angles of the cells, anatropous. *Style* filiform. *Stigmas* three, linear or petaloid, spirally twisted. *Berry* ovate, subglobose. *Seeds* numerous.—(*Endlicher, Genera Plantarum*, 1301.)

Æchmea discolor, *Morren.* Variegated Æchmea.—Leaves broad, concave, reflexed, shortly acuminated, smooth, shining, slightly undulate and serrate, the teeth short and distant; panicle surpassing the leaves, the lower branches divaricated; the scape clothed below with lanceolate, elongate, reflexed scales; bracts wanting; calycine lobes oblique, obtuse; petaloid lobes obtuse, connivent.

Synonymy.—Æchmea discolor, *Morren, in Annales de la Soc. Roy. de Bot. de Gand.*, ii., 175, t. 65. *Hooker, in Botanical Magazine*, t. 4293.

Description.—A tropical herb, differing from others of the genus in the absence of the bracteoles beneath the flowers. The leaves are broad, suddenly acuminated near the apex, concave, reflexed, with parallel slightly undulated margins, sharply serrate with very short distant teeth; they are of a dull green above, and dirty violaceous beneath. The panicle is longer than the leaves, of a scarlet colour above, and bears the flowers distantly spiked along the branches; the scape is clothed below with elongated lanceolate scales, loose and reflexed; the lower branches are divergent, and the flowers without bracteoles. The calycine segments are oblique and obtuse, scarlet below, and blackish on the fore portion; the corolline lobes are obtuse and connivent, whitish at the base, and stained with scarlet in the upper half.—A. H.

History, &c.—Our drawing of this very handsome species was made from a plant in the collection of Messrs. Henderson, of the Pine-Apple Nursery, Edgeware Road, where it was finely in bloom in the month of January. It is found to be a very valuable plant for ornamental purposes, owing to its winter-blooming habit, and the length of time which at that dull season its brilliantly-coloured blossoms remain in a fresh and attractive condition. The unexpanded buds, as remarked by Sir W. J. Hooker (*Bot. Mag.*, *t.* 4293), have a most striking resemblance to the seeds of Abrus precatorius, commonly called Crab's-eyes, and which are sometimes strung as necklaces. This Æchmea is believed to be a native of Brazil, and was introduced to English gardens from those of the Continent some four or five years since.

The generic name Æchmea is derived from the Greek *aichme*, a point, in allusion to the rigid points or awns with which the calycine lobes are, in some of the species, terminated.

Culture.—Like all the plants belonging to Bromeliaceæ, this very remarkable plant requires peculiar treatment—viz., a season of free growth, a season of rest after the growth is matured, and then liberal treatment, to compel the production of the flower stem. Supposing you have a young healthy plant, in a four-inch pot, shift it immediately into an eight-inch pot, using a compost consisting of rich turfy loam, fibrous peat, and half-decomposed leaf mould, in equal proportions, with which, some gritty sand, potsherds, and charcoal might be intermixed. Use the compost in rough pieces, and pot rather lightly. After potting, place in a bottom-heat of 80 degrees, and when the plant begins to grow freely, water with weak manure-water, once or twice a-week. The plant will probably require a second shift towards Midsummer: use the same compost, and pursue the same general treatment, but take care to bring the plant into a state of rest by the end of September. Through the winter, it need not be plunged in bottom-heat, but must be kept at the warm end of the plant-stove, and rather dry at the root. When it is wished to bloom the plant, plunge it at once in a brisk bottom-heat, water freely with manure-water, and do everything in your power to induce vigorous growth. After the plant has bloomed, the old part may be cut away, and the suckers, of which five or six will be produced, treated for free growth as before directed. The Æchmea is propagated by suckers, in the same way as the Pine Apple.—A.

WHAT IS A SHRUBBERY?

By Mr. ERRINGTON, C.M.H.S., Gardener to Sir P. Egerton, Bart., M.P., Oulton Park, Cheshire.

OF all the appendages to a garden, the ordinary shrubbery of the olden time, has always appeared to me the most unsatisfactory. I speak of those long, unbroken, belt-formed borders, composed of various shrubs of the most conflicting characters, intermingled in a regular pell-mell manner. Such, certainly, are not so common as in former days; but enough is left of them, in various parts of the kingdom, to shame British gardening, which ought to take a much higher position in this respect. If such are, indeed, conducive to the beauty of the landscape, or really ornamental in themselves, it is matter of surprise that our great painters have not availed themselves of this indefinite thing in their compositions; but there, we may look for it, I fancy, in vain.

When such a shrubbery has attained some age, we generally find the lower part of most of the deciduous shrubs become lean and naked; in fact, many of them more like tall pea-stakes than handsome bushes; whilst the debatable ground beneath, having long since been deserted by the belligerent twigs, the last keen rivalry (which, in the order of things, must finally end in the utter extermination of some of the party) is kept up with singular confusion, by the half-starved extremities. To be sure, a sprinkling of evergreens still left, serve to give some animation to this living rubbish-yard, but they are sure to exhibit unmistakeable symptoms of the conflict they have endured; and, unless composed of Hollies, or other tree-like evergreens, they too must, ere long, become denuded stumps, and serve only to augment the faggot pile.

The late lamented Mr. Loudon was not far wide in his ideas concerning what he termed the "gardenesque;" and I really do not see why this principle of high dress should not be applied to deciduous shrubs, in their disposal about the pleasure-ground. The genuine landscape gardener would, of course, become alarmed, with the idea of bare patches of soil, and destruction of breadth, which a dotting system is known to give rise to: and herein lies, indeed, a slight difficulty, not, however, of a really insuperable character. It occurs to me, that most of our deciduous flowering shrubs might be cultivated with much better effect on the massing system, or singly; and that the evergreens in general, and timber trees, or trees of half height, would class together as to general effect. By this arrangement, the main features of the pleasure-grounds, as far as breadth was concerned, might be, for the most part, composed of the latter class; where, amidst dense evergreens, there might tower up at intervals such things as the Sorbus family, the taller Thorns, the Turkey Oak, some of the Mespilus family, the Ailantus, Sumachs, or, indeed, any of the more moderate-growing fancy Arboretum trees. Subordinate to these, and nearer the margins, the best flowering deciduous shrubs might occur singly or in small masses; and, to relieve their lean appearance in winter, single specimens of huge evergreens might be interspersed throughout them; not by a dotting system, for most of these materials might, where the grounds are tolerably extensive, be congregated around, or off the margins of the large masses. As single evergreens, those of the enduring kind should be freely used, and also those possessing much character or expression. Here should be seen the sombre and massive Yew; the dignified-looking Hemlock spruce with its weeping plumes; the noble Holly, soaring majestically with its rampant leader, the lower boughs still fresh and sweeping the turf; the sturdy and robust-looking Portugal Laurel; and last, not least, the graceful Deodar. Such might, occasionally, advancing and receding, as single trees, serve to break the outline of the larger features, and to relieve any meagreness arising from the use of deciduous flowering shrubs—the chief point in these remarks.

Where grounds are very extensive, leafy masses of Rhododendrons, squatting down to the turf, by pegging, or otherwise, would form a connecting link between the sward and the shrubs; even as the latter, assisted by trees of medium growth, lead up to our majestic timber trees; thus linking, as it were, the well-defined portions of the landscape into one harmonious whole.

Some of these shrubs might be placed singly, some in groups of, perhaps, three or four; observing, as to the latter mode, to plant them far enough apart, in order that they do not starve each other into leanness through root competition. Many of those which are known to sucker well, might, with advantage, be cut down, after being established a season; they would then throw up abundance of shoots, which, with a little age, would become a mass, reaching down to the sward. This would, I conceive, be a most desirable plan, as the interior would be concealed, and mowing, or other operations within, would be done away.

In these suggestions I have been taking the case of the *principal* walks, or drives, from the mansion, and their detours, and supposing a place of considerable extent, where a great breadth of margin presents itself for such operations; the main business being as to the planting, that, whilst we enrich the grounds as much as possible in point of detail, breadth would be supported, and a dotting system avoided.

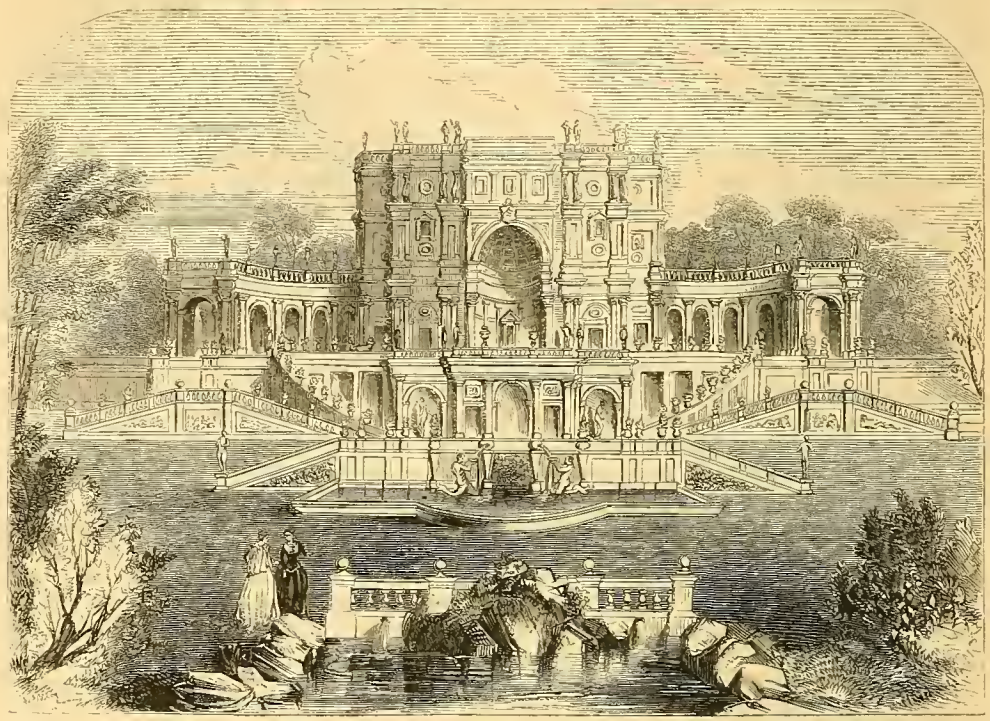
As for cross or subordinate walks, or those in the immediate vicinity of the gardens, or mansion, here there will arise, at times, a necessity for a continuous belt, or shrubbery; sometimes as a screen, and sometimes contain a rich collection of the smaller and more dressy shrubs. And here I would point to the propriety of keeping Loudon's maxim in view, if such borders are to be kept in beauty for many years. I mean the planting the shrubs so far apart, that every one shall have free liberty to show its individual form, and to preserve it; no two, in fact, should ever be allowed to touch. It will be said, what is to be done with the ground between? I answer, keep it perfectly clean by hoeing and raking, and the oftener these operations are performed, the more satisfaction it will give. Those who are anxious to break the flat outline of the shrubs, might use the Hollyhock, the Dahlia, &c.; but these would sadly compromise the end in view, and would appear much better ranged or grouped in the rear. Pillar Roses would, perhaps, form as legitimate an object as anything; and would harmonize better than either the Hollyhock or the Dahlia; inasmuch as they would, at least, bear the impress of a shrub. Much room would, however, be requisite, in order to carry out the necessary operations. Independent of anything else, I should say, that the shrubs under this style ought to be, on an average, nearly five feet apart; this will, of course, alarm persons of limited space. I would appeal, nevertheless, to their own experience of what occurs in their plant-houses, on behalf of room. Who would prefer a plant-house crowded with a collection of a couple of hundred species badly grown, to one containing only half the quantity; in the latter case, the plants complete specimens?

No, it is not the number of kinds which a border or a house contains, that constitutes the *ne plus ultra* of effect, but a judicious selection, well grown, free from leanness, and with everything about them perfectly clean and in high dress—art, in fact, boldly recognised. Our old English gardeners had a feeling akin to this style; as witness their efforts at producing hobgoblin yews and other trees, by a dubbing system. This was indeed the "recognition of art" with a vengeance; and partly on a par with this, in point of taste, is much of what used to be called rustic work, in which chairs and seats were made to appear as though they grew out of the spot where they were placed. This might have been properly termed the recognition of whim. A bolder and simpler style has of late years prevailed, and we may now find seats which, although not adapted to the drawing-room, are not ashamed to avow the mechanic's art.

In the general disposal and management of deciduous shrubs, as here suggested, the mere botanical bearing of the subject is of course dismissed. Those who want to form arboretums, must take other views; although I do not think it by any means impossible to reconcile the botanical with the picturesque.

Whilst on this subject, I may perhaps be permitted to draw attention to the propriety, in planting select trees or shrubs, of securing a due amount of those noted for their autumnal tints. Who does not admire the rich gradations of tint which certain trees or shrubs undergo, during the boisterous gales of October? Even the old Virginian Creeper is more admired by far, than when in the most verdant dress. Then we have the Scarlet and other American Oaks, the Liquidamber, the Black Oaks, the Kolreuteria paniculata, with many other trees and shrubs; even the old Merry-tree or Wild Cherry has a splendid effect in autumn in our woods, although some seedling varieties possess much richer tints than others. Again, in the selection of shrubs, planters should keep an eye on those which herald in the spring, and also on those which possess an unusual share of character, the latter placed in bold relief. As examples of the former, I would quote such things as the Chimonanthus fragrans, the Cornus mascula, the Mezereon, the Ribes sanguineum, the Rhododendron dauricum atrovirens, the Corchorus japonica, &c., &c., &c.; and, of the latter, the Cryptomeria japonica, the Abies canadensis, the Ailantus, the Deodar, the Sumach family, some of the Acacias, the Deciduous Cypress, the Purple Beech, Weeping Laburnums, &c. These, and indeed many others in which our nurseries are now very rich, judiciously selected and happily placed, without frittering away the main features of the landscape, would impart an amount of dignity and interest to pleasure-grounds, rarely met with at present. In the Coniferæ, too, what a host of treasures! Surely our British gardeners, in another half century, will not exhibit so many bare poles and peas-stake points in the sky outline, as they assuredly do in the present day.

[Next to a starved and bare-stemmed condition of the plants themselves, the greatest blemish in the appearance of ordinary shrubbery borders is the margin of raw, bare earth, perpetuated by the edging-iron system; and which, however allowable in the case of newly-formed clumps and plantations, while there is space for the introduction of hardy flowering plants, is highly objectionable when the shrubs have made sufficient growth to admit of the surface being turfed up to meet their recumbent branches.]



CASINO SACHETTI AT ROME.

NOTES ON DECORATIVE GARDENING.

By H NOEL HUMPHREYS, Esq.

ARCHITECTURAL FEATURES—THEIR PROPER POSITIONS—TRUE GARDENESQUE STYLE.

TOWARDS the close of the last century, an exaggerated taste for the simply natural, or what has been termed the picturesque, banished from English gardens many of their best and most appropriate features,—among others, that simple and yet noble adjunct, the terrace. Brown, says Sir Uvedale Price, has been celebrated for the *bold* idea of taking down Richmond Terrace, and his successor, for the still bolder notion of blowing up the one at Powis Castle; while the fine architectural character of these features were to be replaced by gently undulating turf, and serpentine walks, and these winding forms were not merely used to blend the garden into the landscape, but commenced at once, close to the house, where straight lines, in accordance with the forms of the building, were so much more appropriate. By this means, the landscape features were brought into immediate contact with the residence, making no difference between the arrangement of the ground close to an architectural composition, and that at a distance; "between the habitation of man and that of sheep." The destruction of our fine old terrace-walks, by the race of landscape gardeners of the last century, headed by Brown, was partly the result of the extravagant excesses to which architectural gardening had been carried, particularly in France and Holland, where the fine taste of the Italian school had been so exaggerated as to become caricature; a term which may be fairly applied to the Dutch gardening of the end of the seventeenth century, which was imported into this country with the accession of William the Third. In this Anglo-Dutch school, the architectural decorations were over-elaborated, and degenerated into the most wretched taste; trees were cropped into the forms of court ladies; statuary reduced to Dutch shepherds, and these shepherds and shepherdesses painted to imitate Dutch nature; in addition to which, were multitudes of pretty terraces connected with endless archways and countless steps. Such abuses of art found, first, satirists to ridicule them, like Horace Walpole, who laughed at the idea of thus "walking up and down stairs in the open air;" and then Kent and Brown, bold innovators, swept them away, leaving nothing in their place—nothing to form, as it were, the

setting to the gem—no harmonious concord to accompany the main building, with other tones in the same chord—no framing to set it off—leaving them, in fact, like a picture without a frame, surrounded with nothing but

"Shaven lawns, that far around it creep,
In one eternal, undulating sleep."

Yet the "natural" style, as it was called, or rather this poor sham of Nature—these artificial slopes, imitative hillocks, and unnaturally winding walks, were yet felt as a relief, after the reign of the overwrought Dutch and French terrace school, and the fame of these "*jardins Anglais*" travelled to the Continent, where they were imitated in the grounds of almost every chateau, palace, or villa of importance, but imitated with rather more judgment, for the "*jardin Anglais*" was almost always placed at a distance from the house, from which its irregular features were concealed by the stately forms of trees cropped into architectural form, or some other arrangement in accordance with the character of the dwelling. Yet this was not always the case; the new English system appears occasionally to have been carried to excess; the Abbé De L'Isle, in his poem "*les Jardins*," complains of hills, lakes, and sloping woodlands, being crammed into situations totally unfitted for them, either from their position or extent; in the passage beginning with, I think—

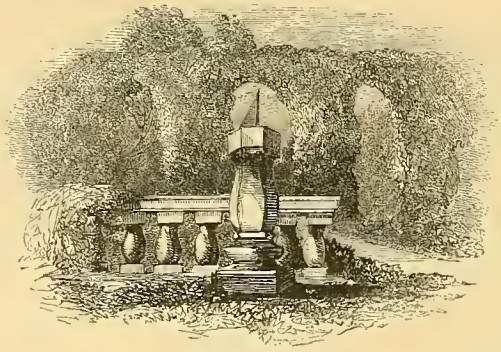
"Des lacs et des montagnes sur un arpent de terre,"

And I recollect, very recently even, when last in Paris, going to see a furnished house in the Chaussé d'Antin, which was advertised, among attractions, to possess its "*jardin Anglais.*" This interesting feature I found actually existing in a back court of some sixty feet in depth; but the smallness of the space had not caused any of the main features of the "*jardin Anglais*" to be omitted: there was the undulating lawn and serpentine walks, the belt of Scotch firs, the winding rivulet with its rocky cascade, and the *lake:* also the *foret des Sycamores,* formed by groups of six or seven small and rather miserable specimens of that tree.

In these preliminary remarks, I have endeavoured to show that the school of gardening, in which architectural ornament is overdone, and that in which it is altogether absent, are equally defective; and I shall therefore attempt to point out the extent to which architectural features may be used in gardening, with advantage. It may easily be conceived that a house of considerable architectural pretension, placed at once in the midst of winding walks or sloping lawns, would appear less complete than when fronted by an esplanade or terrace, however moderate in extent or simple in construction.

Of the old gardens, it has been said that they were *formally* laid out; but they were laid out to accompany that which was necessarily formal and symmetrical, namely, the main lines of the residence, to which they served as a sort of mounting or frame. The engraving exhibits a rich—perhaps over rich—example of a villa residence of the high Italian school, surrounded with its legitimate architectural embellishments, its natural *framing* and accompaniment: it is the Casino of the Sachetti family at Rome, built from the designs of Pietro Barettini da Cortona, and was once one of the finest specimens of this class of garden and villa architecture in existence, but when Vasi published his engraving, it was described as then going to decay. From this imposing composition, it may be inferred that I consider architectural works, on an enormous and costly scale, as necessary to give due effect to a country residence, and blend it properly with the surrounding landscape; but such is not the position I am about to assume. On the contrary, I think that even a simple turfed embankment, surmounted by a low hedge, formed of some hardy evergreen shrub, cropped very square and flat at the top, might, either with or without the addition of a single and simple flight of steps, and a few appropriate pedestals and vases, be sufficient to produce the effect described as suitable, or, at all events, form a very desirable approach to it. In accordance with the more irregular and picturesque forms of cottage architecture, the terrace might be guarded by balustrades of simple rustic work of branches, which would produce a very agreeable and appropriate effect. A principal cause of the agreeable effect of stone or brick terraces is, that they harmonize in material, and consequently in colour, with the main building, thus carrying out its tone to the landscape; but still another step of modulation is requisite—the perfect blending even of these secondary architectural features with the foreground of the landscape, and this may be judiciously effected by the aid of cropped trees; which, while they agree in colour with the landscape, yet harmonize in forms with the residence and the terrace, and so become a link holding harmoniously together with the gardenesque and the picturesque—the artistic and the natural—restricting ourselves in using these phrases to the irregular forms of nature, as the masters of landscape painting have loved to paint them, and not in the extended sense given to the term by Price and others.

The engraving exemplifies this effect, in which the architectural and regular forms of a piece of balustrade and a sun-dial, find a certain degree of analogy in the artificial arches formed by some cropped limes, while the tone of colour of the latter accords with that of the irregular shrubbery beyond, and thus the blending between art and nature becomes gradual and pleasing. But the various effects to be produced by terraces, vases, statuary, artificial water, fountains, &c., I must discuss separately.



ON THE CULTIVATION OF ACHIMENES.

By Mr. JOHN KEITH, Spinfield, Buckinghamshire.

SUPPOSING the tubers are at rest in the pots in which they flowered during last year, about the beginning of January, I generally start the first batch, after having selected a few pots of each sort that had flowered earliest. I proceed by filling some shallow pans, within about two inches of the top, with a mixture of leaf mould and silver sand, after which I shake the tubers out of the old soil, and place them in the pans at about half-an-inch apart, covering them with the same mixture. I am aware that I depart from the usual practice of many, by not starting them in the pots in which they flowered. My reason for so doing is this, that by placing them in the pans, the tubers are all one distance from the surface; consequently they all appear at the same time, and are more robust than when started in the old soil, and escape the risk of being mutilated when being disengaged from their old bed; which, with the utmost care, I find is often the case with the latter mode. After this operation is accomplished, I place them in a pit, with dung heat, ranging from 70 to 80 degrees, giving water very cautiously until they appear above the soil. Indeed, they only require as much as to keep the soil moist, but not wet. When they have attained the height of four inches, I transfer them at once to their blooming pots; the size of the pots being regulated by the object to be attained. For the stage of a common greenhouse I find an eight-inch pot the most convenient size; but for large masses I use thirteen-inch pots. The compost I use is equal parts of loam, peat, leaf mould, and well-decomposed cow-dung, with as much silver sand as will give the whole a grayish appearance. If to be had, I use charcoal, both for mixing with the soil and placing at the bottom instead of potsherds, to the depth of two inches, over which I place a layer of moss to prevent the soil from getting amongst the drainage. I consider good drainage an essential point in pot cultivation. After filling the pot with the compost to within three inches of the top, I give a gentle rap on the bench to settle the soil, then placing the plants on the surface, and filling up round the plants with soil, until the pot is full, I give it another rap on the bench, to settle the soil more perfectly about the plants. I complete the process by giving the whole a gentle watering through a fine rose, and replacing them again in the same heat, keeping the pit close for a few days until the plants get a little established. About sixteen plants to an eight-inch pot, of such varieties as A. longiflora, grandiflora, patens, &c., will make a nice specimen; the stronger growing varieties, such as pedunculata, hirsuta, &c., require to be planted much thinner, and, if stopped two or three times during the growing season, they will form fine bushes. After the plants get established in their pots, I give them air on all favourable occasions, always keeping a nice moist atmosphere, which is highly beneficial. Care must be taken to keep a due supply of moisture to the roots, avoiding excesses as much as possible. As the suns ray's become more powerful, shading with thin canvas will be necessary.

When the plants attain the height of about six or eight inches, I remove them to the stove, and at the same time have them staked. The description of stakes I find best adapted is one-year-old suckers from the bottom of filbert trees; being much more slender than willows, they give a neater appearance to the plants, and have not that stiff appearance that stakes made of deal generally have—the latter being better adapted for harded-wooded plants than plants of this class. I always place a stake to each shoot, at equal distances apart, in a slanting position, round the outside, letting them rise towards the centre, which forms nearly a half ball. I prefer tying up singly, as the plants have a neater aspect than by tying them up in small bundles, which does not admit space for all the blooms to expand. After the shoots are tied to the stakes, I cut the latter to the height the plants are likely to attain; and nothing further is required but, as the shoots elongate, an additional tie to support them, and the usual routine of airing, watering, shading, &c., until they come into bloom; then they may be removed to the greenhouse or sitting-room. By attending them with plenty of moisture, and avoiding cutting winds, they will continue in bloom for a long time. I may mention that I give occasionally a dose of clear manure water, which causes much finer blooms, and is a great support to them when the strength of the soil is exhausted. If it is wished to increase any favourite sort, this can easily be done by placing cuttings in bottom heat, which will root in a very short time; also by dividing the sealy bulbs; and many of the varieties send out small tubers on the stem above the soil, which make equally good plants with the under-ground tubers. After the blooming season, the roots may be ripened off by gradually withdrawing the supply of water. When ripened off I place the pots on their sides, on a shelf over the pipes, behind the stage of the greenhouse, where they rest secure until wanted to start the following season. By starting a few pots once a-month, noting the time of introduction, they may be had in bloom throughout the year. I find they keep much better than otherwise by letting them remain in the old soil during their season of rest.

Review.

Elementary Botany for the Use of Beginners. By T. S. Ralph, A.L.S., &c. London: Pamphlin.

Low-priced books on elementary, rudimentary, or popular Botany, are become so numerous, that one feels disposed to criticise them much more closely than if such were not the case; and each succeeding attempt to set forth the alphabet of botanical science, becomes thus in its turn more keenly scrutinized than its predecessor.

There seems to exist a notion, wide-spread and prevalent, that it is a comparatively easy task to write elementary books for those who are beginning the study of any particular branch of science; and, without doubt, such books are prepared with a small amount of mechanical labour, inasmuch as they generally consist of an abridgment of the subject on which they treat. Notwithstanding, however, this general opinion to the contrary, it appears to us that nothing can be more difficult than to write a *good* book for beginners; who *require rather to have the essential facts* selected and set before them, than *a digest or abridgment* of the whole scope of existing knowledge on the subject; and more than this, they require to have these facts expressed in a style so plain and unmistakable as few writers attempt to adopt, or attempting, succeed in realizing. It is extremely difficult for those who are well-versed in any branch of science, to place themselves in a position to fully realize the wants of those who are either partially or wholly unacquainted with the subject; and hence it is that we so often find those who are well qualified to teach advanced students, altogether fail in their object when they attempt to impart the rudiments of their subject to those who have no previous knowledge thereof. Terseness, and conspicuity of ideas combined, are the essential features of elementary teaching; even the former without the latter, often leads to the enunciation of generalized statements, which require so much after qualification, as to become confusing to the learner.

Tested by this standard, we do not see that Mr. Ralph's elementary lessons are more perfect than many of those which have preceded them; and the author appears to us to fall, now and then, into the all but universal error, of forgetting for what class he is writing, although he evidently set out with the design of making himself intelligible to all, even the most inexperienced readers. To this end a particular arrangement of the subject is adopted, "as simple as the author has found it to be in his power to follow out"—the plan is, "that of commencing with simple views of complex objects, and afterwards admitting combinations of various kinds, introduced as gradually as the subject will admit." Nothwithstanding the exceptions, most of the ideas expressed are clear and perspicuous; and a very good plan is followed throughout the book of teaching by means of the analysis of well-selected examples. The peculiar division of the subject, which the author has adopted, has, however, led him now and then, into some confusedness and incompleteness in his statements. Thus, at page 5, we read of the stem, that, "as a general rule, whatever part of a plant is above ground, of a greenish or greenish-brown colour, may be considered

as a stem, or belonging to the stem; while *all below the ground as belonging to the root*, which is of a lighter colour and never green;" and further on, when the stem is again treated of, we read, "as a rule, no leaves or buds are to be met with on roots, and when these are found upon parts of a plant growing under ground, such portions are considered to be *underground stems*;"—the idea of an underground stem being excluded from the first of these passages.

The dubious doctrine of the growth of annual rings of wood, is stated without qualification of any kind, thus :—

"Each year a fresh layer of wood is added to every part of the tree, and as some parts are older than others, so these will be found to possess more wood; the wood deposited is added outside that which is already formed; and the next year's wood will be added or deposited outside that which is formed this year, and so on; each layer of wood being younger than that which has gone before. A fine line separates the different layers from each other; and the number of years the branch or stem has been growing can be reckoned by counting the layers or rings of wood which exist in it."

The truth is that each ring or layer of wood will represent one period of growth, whether that period may have been a year or more, or less; and beyond the first few layers, in the case of deciduous trees adapted to a particular climate, the ring theory becomes a very unsafe test of the actual age of a stem.

These and a few similar defects scarcely interfere, however, with the utility of Mr. Ralph's little manual; which will, no doubt, fulfil its avowed object, that of being a guide to the further study of botany, in the case of all those who take it up with a determination to profit by its use; without which determination, made and acted on, no instructions, however excellent, can be of much avail. The illustrations consist of twenty plates, containing numerous very clear and expressive figures.—M.

HORTICULTURAL SOCIETY.

March 5.—The garden of the Society furnished the most attractive display of plants. Among the most conspicuous, were the following subjects :—A large bush of the beautiful Inga pulcherrima, which Mr. Gordon flowers well by giving it a dry, cool rest in autumn; two Acacias, well suited for pot culture, or for a conservatory, on account of their manageable size—rotundifolia with deep yellow flowers, and celastrifolia with the flowers pale straw colour; Polygala Dalmaisiana, a showy hybrid, of dwarf habit, and having deep purple flowers; the dwarf gay Siphocampylus manettiæflorus; and the sweet-scented, winter-flowering Trymalium odoratissimum. There was also a cut specimen from the magnificent Lælia superbiens, now blooming in the Society's garden. Mrs. Lawrence, of Ealing Park, sent a Mormodes, to which a certificate was awarded; it was supposed to be new, but its history was unknown; it bears erect racemes of greenish cream-coloured flowers. Mr. Packman, gardener to J. Gadesden, Esq., sent a fine Phaius grandifolius, having eighteen racemes of flowers. From Messrs. Loddiges, was a collection of Orchids, including several varieties of D. nobile, the most remarkable of which were intermedium album, and a new, dark, rose-coloured variety from Darjeeling, to which, in conjunction with some of the other plants, a Banksian medal was assigned; one of the prettiest in the group was a dwarf large-flowered Odontoglossum, called Cervantesii roseum, in which the whole flower was suffused with a delicate rose, or French white.

Mr. Leyton, of Hammersmith, sent a pretty bright blue Cineraria with white disk, called Hammersmith Beauty; the habit is tolerably good, and the flower will, doubtless, be found a very neat one for bouquets. Mr. G. Glenny sent a collection of Hyacinths, the remains of a set of one hundred and seventy kinds which he had forced; among them Orondates, States-General, Augelique, Pasquin, Emetius, Satella, a remarkably deep bright red, Voltaire, Vulcan, Laurens Korster, very fine, Cœur Blanc, blue with white centre, very remarkable, were the best. The same gentleman also sent a Crocus, called Incomparable Blue, a flower of very superior form, almost like a fine tulip, and of stout and robust growth; the colour is a deep purple pencilled on the inside. From W. Everet, Esq., of Enfield, was a scheme for supporting Rose poles; it consisted of a cast-iron socket with three prongs, and the pole or stake being fitted into the socket with pitch, it is anticipated that the poles will be much more durable than if they were inserted in the soil. Although the scheme is a good one we suspect the most vulnerable points will still be between wind and water, and that however much the pitch may preserve the part in the socket, the poles will still be found to decay just above the pitch. Mr. Roberts, of Eastcheap, sent a new garden pot, contrived so as to ventilate the roots of the plants, and also to place a supply of liquid manure at the disposal of the plant. We venture, however, to say the pot is useless, and however pretty it may look in theory, it will be found worthless in practice.

NEW AND RARE PLANTS.

Berberis ciliaris, *Lindley*. Ciliated Berberry. (*Journ. Hort. Soc.*, v., 5.)—Nat. Ord., Berberaceæ, § Berberideæ.—An evergreen shrub, apparently unarmed, with fascicles of oblong, lance-shaped leaves, reticulate, and margined with a fringe of spines. The flowers grow in compact, erect, sub-corymbose clusters, and are probably yellow.—From Bolivia; supposed to have been introduced about 1848. Flowers not yet produced in England.

Pharus vittatus, *Lemaire*. Striped-leaved Pharus —Nat. Ord., Graminaceæ, § Oryzeæ.—A curious and pretty grass—a herbaceous perennial, requiring a stove. It grows nearly a foot high; the leaves obovate-lanceolate or rhomboid, acuminate, entire, and slightly undulated at the margins; they are beautifully striped, on both sides, with irregular bands of white. The flowers, which grow in a panicle on a long slender stalk, are small and pretty, the fertile ones of a pale rose and white colour; the glumes of the male flowers brownish red.—From Guatemala; introduced to Belgium in 1847. Flowers in summer.

Echeveria retusa.

ECHEVERIA RETUSA.

Nat. Order, Crassulaceæ § Crassuleæ.

Generic Character.—Echeveria, *D. C.*—*Calyx* five-parted, lobes leaf-like, erect. *Corolla* perigynous, five-parted, lobes erect, thick, rather rigid, mid-nerve thickened, sub-three-sided at the base, acute. *Stamens* ten, inserted at the bottom of the corolla, included. *Hypogynous scales* short, obtuse. *Ovaries* five, free, one-celled. *Ovules* many, on the ventral suture. *Capsules* five, follicular, attenuated into subulate styles, free, bursting along the greater part of the length on the inner side, many-seeded.—(*Endlicher, Genera Plantarum*, 4621.)

Echeveria retusa, *Lindley*. Retuse Echeveria.—Leaves obovate-spathulate, scattered above, the old ones retuse, glaucous, crenulate, the cauline linear-oblong, quite entire, with the base detached; panicle dense, sub-corymbose, branches few-flowered; sepals linear, unequal, shorter than the corolla; petals carinate, acute, gibbous at the base.

Synonymy.—E. retusa, *Lindley, in Journal of the Hort. Soc.*, ii., 306. *Bot. Register*, 1847, t. 37.

Description.—A fleshy shrub, with the lower leaves rosulate, obovate-spathulate, glaucous, crenulate, and, when old, excavated at the apex (retuse); those on the stem more and more distant upwards, oblong, quite entire, and with the base separated from the stem. The panicle is close, having a corymbose appearance, but the branches are few-flowered; the flowers are axillary to fleshy bracts. The calyx is deeply divided into five unequal, green, leaf-like, spreading lobes. The corolla, inserted on the calyx, is five-parted, the teeth acute, erect, and much longer than the calyx, keeled and gibbous at the base, of an orange red externally, the margins and interior yellow; the lobes of the corolla are arranged so as to form collectively an angularly campanulate flower.—A. H.

History, &c.—For the introduction of this pretty species we are indebted to the Horticultural Society, who obtained it in the early part of 1846, through their collector, Mr. Hartweg, by whom it was found growing on rocks near Anganguco, in Mexico. It is a pretty dwarf greenhouse plant, blooming freely in winter and spring, or from November to April. Our plate is prepared from a drawing made at the nursery of Mr. Gaines, of Battersea, where there was a remarkably fine specimen, bearing a dozen of its compact panicles of flowers towards the end of January. The figure necessarily shows but a small portion of the plant.

Culture.—The Echeverias are succulent plants, all more or less ornamental when in flower; some dwarf and herb-like in their manner of growth, and others more or less shrubby in their habit. They are all free-growing plants, requiring to be kept in the greenhouse, and, like most other succulents, to be carefully watered, especially during winter; in fact, the soil must never approach a soddened condition, an essential point in the culture of most plants, and which is usually sought to be secured, in the case of succulents, by a very porous mechanical composition of the soil in which they are grown. They must, however, be kept freely supplied with water whilst making their growth. What is called sandy loam, or, in place of this, any pure loam, made rather porous by the addition of clean sharp sand, should form the staple of the compost used for them; three parts of this porous loam, mixed with one part of pounded bricks, or of charcoal broken up quite small, will grow them well; and as they gain size, they require moderate-sized pots, which must be thoroughly drained with potsherds or charcoal. While growing, the plants may be kept in a light airy part of the greenhouse; and when the growth is completed, they should be set in a dry sunny place, and be sparingly watered, which will serve to thoroughly ripen them, and secure their flowering. As conducive to this ripening process, a gravel walk on the sunny or south side of a wall or glass-house, is no bad substitute for the exposed rocks of their native home.

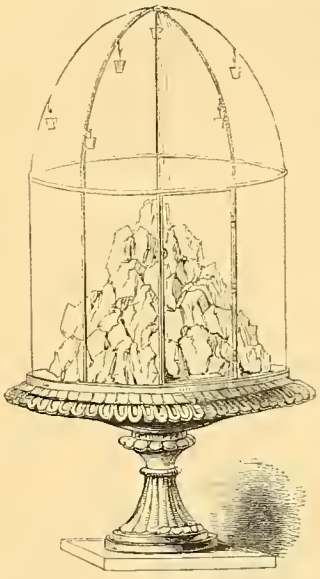
The Echeverias are readily propagated by the leaves, especially those produced along the flower stem; these, if suffered to fall on the surface of the soil, will soon become converted into young plants; and so strong is this tendency, that in some of the species, these cauline leaves form starveling plants if they accidentally fall on the shelves or floor of the house, and are suffered to remain undisturbed. When they are planted, their lower ends should be very slightly inserted into a pot of very sandy loam, which must be watered only sufficient to keep the surface slightly damp. Sometimes, indeed, as already mentioned, this semi-planting process is not necessary; and, in any case, leaves laid on the surface of the soil, will form plants, if they are but prevented from becoming parched up.—M.

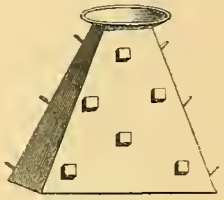
FERNS IN GLASS CASES.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

IT is very gratifying to observe the study of our beautiful native Ferns becoming so popular, particularly amongst lady amateurs. No study can possibly be more interesting, I may say fascinating, when entered into *con amore*. Now, as I do not doubt but that there are many who are partial to the pursuit who have no garden in which to plant them, yet would like to have a few, at least, of their favourites growing under their immediate inspection, I will endeavour to describe a method of preparing a glass case, by which they may succeed in growing several varieties in a very interesting manner.

I should prefer a stand similar to that represented in the engraving; it should have a diameter of three feet, but less would of course suffice, in cases where that may be thought too large. The glass case should be made to fit exactly to the inside of the stand, and should have the frame-work formed of stout brass bars, well secured to a strong rim of zinc round the bottom. A department on each side should be made to open, care being taken that these openings are made as nearly air-tight as may be, and a few hooks should be securely fastened to the bars in the upper part of the dome, by which to suspend small plants in pots. The stand should be filled nearly to a level with the rim with broken potsherds or sandstone, or any rubbly porous material. Over this should be laid a small stratum of sand, to make a very level surface. In the centre, on this level surface, place a four-sided cone of zinc, about sixteen inches in height, with a saucer at the top, and having some strong pieces, of about two inches square, well fastened to and projecting from the sides. Next commence around the base of the cone, and place angular pieces of sandstone of about five or six pounds weight each, and pile up thus completely over the cone. The projecting pieces will assist in retaining the stones in position; and a most important point to be observed is, that every stone must be laid perfectly firm from bottom to top, as the plants will not flourish on a moveable stone. This may be insured by the use of a little cement, as the operation proceeds; but I have also made use of small, flexible wire, passed several times round the mass, for the same purpose. The interstices between the stones may be filled with some nice fibry loam, sandy, soft, and unctuous to the touch. The Ferns are to be planted in these interstices, taking care to make them firm in position.





With regard to sorts, although the smaller-growing varieties are undoubtedly the best adapted for such a case or vase, yet I have used seedling plants of the larger kinds, and these can be removed when they get too large. A case of the size proposed would hold a plant of nearly every British species; but if this were attempted, it would, of course, more frequently require re-arranging. The spaces between the Ferns may be appropriately filled up with various Mosses, Marchantias, Jungermannias, Lycopodiums, &c., so that the whole of the miniature rock may be covered with vegetation, and present a green surface. A large plant of Lycopodium umbrosum, on the summit of the pile, would look beautiful; and small pots of the trailing Lycopodiums may be suspended from the hooks in the upper part of the dome. Previous to the stones being placed, they ought to be soaked for a few hours in water. The saucer at the top of the cone should also be filled with water, and the roots of each plant dipped in water as the planting proceeds. When all is completed, sprinkle the whole with water through a fine watering-pot rose, but avoid deluging it; this watering may be repeated from time to time through the doors, but the case being almost air-tight, and evaporation being prevented, water will not often be necessary. The sandstone I have mentioned is a soft ferrugineous stone, found in many parts of Kent, and so congenial to the growth of Ferns, that their seeds or spores falling on the shady, moist sides of the rocks composed of it, germinate by thousands.

May I, in conclusion, venture to recommend *Moore's Hand-Book of British Ferns* to any one who

is interested in obtaining a complete knowledge of them. It is decidedly the best Guide I have hitherto met with; the descriptive part is very clear and precise, and the plates exceedingly characteristic.

[Those who may be interested in growing the most elegant and choice of the British Ferns in glazed cases, such as Mr. Cox has described, will find the following selected sorts well suited for the purpose. Most of the sorts mentioned are to be obtained without much difficulty:—

Polypodium Dryopteris. Bright green, delicate, and pretty; fronds nearly triangular in outline, annual; height four to eight inches; caudex creeping.

Polypodium vulgare cambricum. Evergreen; fronds broadly lance-shaped, with a kind of fringed margin; height six to ten inches; caudex creeping.

Allosorus crispus. Very elegant, parsley-like; fronds almost triangular in outline, annual; height four to six inches; caudex tufted.

Lastrea Oreopteris. A sweet-scented Fern; fronds lance-shaped in outline, annual; height one and a-half to two or three feet; caudex tufted.

Lastrea Filix-mas. One of the commonest, but a very elegant Fern; fronds lance-shaped in outline, annual; height two to three feet; caudex tufted.

Lastrea rigida. Very elegant; fronds lance-shaped in outline, annual; height one to two feet; caudex tufted.

Lastrea Fœniseeii. Very elegant and compound; fronds nearly triangular in outline, annual; height one to two feet; caudex tufted.

Polystichum Lonchitis. Very rigid and holly-like, evergreen; fronds, narrowly lance-shaped in outline; height six inches to one foot; caudex tufted.

Polystichum angulare. Very elegant and graceful, sub-evergreen; fronds broadly lance-shaped, drooping; height two to three feet; caudex tufted.

Cystopteris fragilis. Very delicate and pretty; fronds lance-shaped in outline, annual; height six to ten inches; caudex tufted. There are several varieties, all of which are very interesting.

Athyrium Filix-femina, var. crispum.

Athyrium Filix-femina. The Lady Fern; one of the most elegant; fronds lance-shaped in outline, drooping, annual; height one to three feet; caudex tufted. There are several varieties, of which one is like a dwarf-curled parsley, but the most elegant has tasselled pinnæ.

Adiantum capillus-veneris.

Asplenium Adiantum-nigrum. Evergreen and glossy; fronds elongate, triangular in outline; height six inches to a foot; caudex tufted.

Asplenium marinum. Evergreen and glossy, dense in its habit; fronds lance-shaped in outline; height six to ten inches; caudex tufted.

Asplenium Trichomanes. Evergreen, with black wiry stalks; fronds very narrow; height about six inches; caudex tufted.

Ceterach officinarum. Evergreen; fronds lance-shaped in outline, green above, scurfy beneath; height about four inches; caudex tufted.

Scolopendrium vulgare crispum.—Evergreen and very distinct in appearance; fronds narrow lance-shaped, undivided, the margins crisped; height, eight inches to a foot; caudex tufted.

Adiantum Capillus-veneris.—Evergreen, and very elegant and distinct; fronds irregular, but somewhat ovate in outline, the little wedge-shaped leaflets attached by fine wiry stalks; height, about six inches; caudex tufted.

Blechnum Spicant.—A very elegant and distinct fern; fronds narrowly lance-shaped in outline, annual; height one foot or more; caudex tufted.

Trichomanes radicans.—Delicately transparent, and very beautiful when seen in a vigorous state; fronds either triangular-ovate or lance-shaped, drooping; height six inches; caudex creeping.

Hymenophyllum Tunbridgense, and H. Wilsoni (unilaterale). — Moss-like, forming dense matted masses, deep dull green, and uninteresting at first sight, but very beautiful on minute examination.

Osmunda regalis.—Almost too large for a case, for which, however, small plants may be used; fronds lance-shaped in outline, annual, differing from all the preceding in bearing their inflorescence in collected masses, occupying the whole apex of the fronds; height two to six feet, or more; caudex tufted.—M.]

NOTES ON DECORATIVE GARDENING.—Rustic Terraces.

By H. NOEL HUMPHREYS, Esq.

I HAVE endeavoured to show, in a preceding article, the necessity of blending the hard and symmetrical lines of an architectural elevation with the gentle and irregular outline of natural scenery, by means of a terrace, or some feature of the kind attached to the principal front. Even a rustic cottage requires to be accompanied, at all events on its principal side, by a moderately broad esplanade or terrace, which, however, does not absolutely require any architectural embellishment of an expensive kind; for, when merely raised a few feet above the surrounding garden, by means of a neatly turfed embankment, a terrace imparts, even in that simple form, a very pleasing air of propriety to the site of the dwelling:—first, it suggests at once that a sufficiently high situation has been selected, possessing due advantage in height over the surrounding ground; secondly, that an amply sufficient space has been carefully levelled and prepared for the erection of the building; and, in addition to these evident and agreeable advantages, art, by its means, is carried beyond the mere form of the house itself, in a manner that causes its vertical and horizontal lines to blend by degrees with the accidental outline of the surrounding vegetation, and undulations of ground.

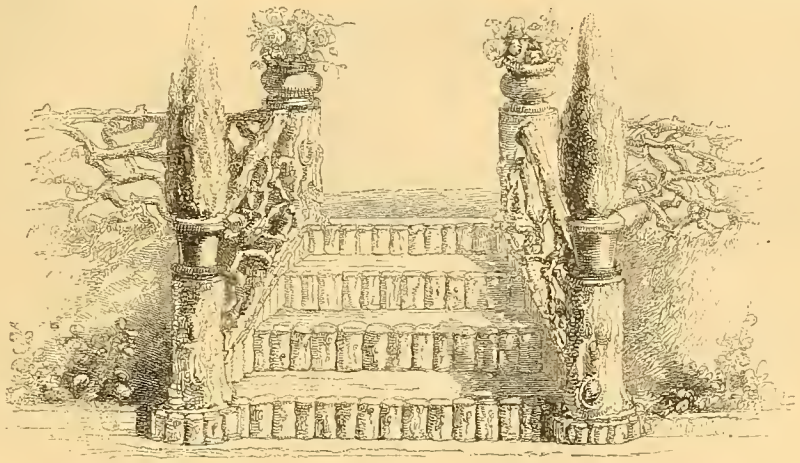
With but trifling increase of expense, a rustic and somewhat more architectural parapet might be formed, of which a suggestive sketch is given in the engraving above. This parapet, calculated to harmonize with a building in the cottage style, is formed by strong stakes, with the bark left on, to which branches, also unbarked, are attached. They must be arranged with that attention to a certain irregular symmetry commonly known as "rustic work." Three or four steps lead from the terrace to the lower ground, which to accord with the rustic character of the parapet, should not be stone, but merely gravel, faced at each rise by short stakes with the tops cut off flat, as shown in the sketch on the opposite page.

The turf bank may be terminated at the bottom by a narrow flower-border, not above one foot wide, in which compact and trim-growing plants alone should be placed. After this modulation from the straight lines of the building, the curved walks of the garden may commence without further restraint.

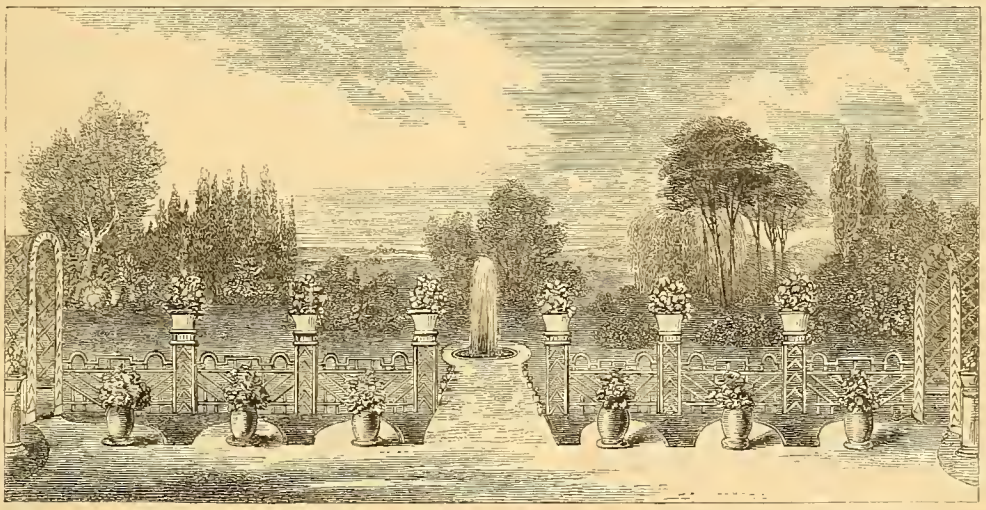
Although the design for a terrace fence, here given, is formed of rustic work of an irregular character,—effects equally consistent with the style of architecture of a rustic cottage may be produced by a symmetrical disposition of the same materials,—the branches might be so arranged as to form interlacing ellipses, which produce a geometric pattern, the repetition of which, at regular intervals, would be extremely pleasing. Or, if the style of the cottage should be Gothic, the interlacings of the branch-work may be easily made to form a pattern of that character, to which, in fact, the style of work lends itself with great readiness.

The other engraving is a design for a terrace, embellished in a manner to accord with a building of somewhat more regular architectural pretensions than the rustic cottage for which the former design is suited. It supposes a house of moderately small dimensions, built in the modern suburban villa style, with which *rugged* forms would not agree, but to which a terrace with a decorative parapet

might yet be added without great expense by forming the parapet of wooden trellis-work, the neatness of which would accord well with the style of the building, and still more so, if the house happened to be



finished with a verandah of similar character. When the terrace is of sufficient width to allow of it, without appearing to encroach upon its apparent size, a summer-house, as in the sketch, would form a characteristic and pleasing terminus at each end; but such features must not be allowed to crowd the residence, as the first quality in a terrace is apparent spaciousness, a character which depends more on treatment than even on real space. This terrace, as in the rustic example, I have bordered, next the parapet, with turf, cut into recesses to receive vases containing plants, by which means the vases

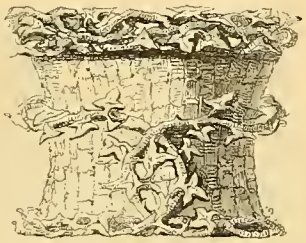


appear to enter into the original plan, and form a necessary part of the composition; whilst, without a framing of that description, such features not only lose great part of their importance, but frequently appear unwelcome spots intruding upon space to which they do not seem to belong.

Any vases or architectural ornaments used to decorate the rustic terrace should be of a corresponding rustic character; the outline, No. 1, represents a stand which is now manufactured, and is suitable to such a situation, though it is more frequently used, without regard to propriety, in places in utter discordance with its style. It has the defect also, though picturesque, of being a mere crude imitation of nature, to which obvious and simple process, art should not descend; but the contrast of the rough bark and the smooth ivy leaves is very suggestive; and I would propose working it into a symmetrical form, which should, like all works of art, bear the evident impress of *design*. The sketch

No. 2 will exemplify my meaning.* No. 3 is a vase of more even and regular form, the smooth outline of which is suited to the terrace with the trellis parapet.

No. 1.



No. 2.

No. 3.

* Should any manufacturer wish to execute a series of plant vases, pedestals, &c., I shall be happy to furnish him with designs of an original and appropriate character. Such things for terraces, halls, &c., are much wanted, and few in good taste are to be found. Any manufacturer may address a few lines to me at the publishers.

EXPERIMENT IN GRAFTING DAHLIAS.

By Mr. J. PATTERSON, Gardener to the Earl of Chesterfield.

THE suggestions thrown out by Mr. Beaton on Phytological experiments (p. 3), remind me of some made by me some eighteen years ago, on the Dahlia. Being anxious to secure some striped Dahlias of a superior class, I selected, in the early part of March, a few cuttings from the propagating roots, of about an equal thickness, and about six inches in length. With a sharp knife I cut from the bottom part of each cutting, a slice of about three inches, as if for grafting, leaving a bud on the outside and bottom part of each to secure their striking. I then selected two cuttings of different colours, contrasting the colours as much as possible, and carefully bound them together with matting, as tight as the tender nature of the plants would allow; leaving about a quarter of an inch at the bottoms free to emit roots. They were treated in every respect as other Dahlia cuttings. When the bark began to swell over the matting at the top of the union, it was carefully loosened; and when the union was complete, entirely removed. From some of the pots one of the cuttings was removed above the union, but no bud allowed to grow; the others were planted as struck. I looked with some degree of anxiety when the flowers began to expand, for the result of my experiment, but met with signal disappointment, as they all came true to the colour of the parent plant. Being disappointed in this, I selected seed from them, but could see no difference from the produce of that and the plants raised from seed taken from other plants. I will, however, try my hand again on some few things, and, in due course, give the result.

[Mr. Patterson's experiments will be found to differ materially from that suggested by Mr. Beaton. The latter was proposed in order to ascertain whether, after the union of two Gloxinia leaves, one tuber would be formed at the point of union conjointly by them, and whether in the next season, or, at least, after its formation, the bud or buds emitted from that tuber, would partake of the peculiarities of the two kinds thus united. No such result could be expected from the mere onward growth of two shoots of a plant simply united at their base, as was the case with Mr. Patterson's Dahlias. It may, perhaps, be questionable whether the proposed attempt could ever result in a successful issue; but this it was Mr. Beaton's object to have tested on all hands. The idea is exactly accordant with the opinions put forth by the late lamented Dean of Manchester, as to the origin of what is called the purple Laburnum; and as they bear directly on the subject before us, we quote some of Dr. Herbert's words in illustration:—

"The history of the plant is, that it was not raised from seed, but made its appearance in the following remarkable way:—A number of stocks of Laburnum had been budded with C. purpureus in a French nursery garden, and the bud on one of them died; but the wood and bark inserted lived, as frequently occurs in such cases. After some time, new eyes formed themselves, one of which produced this hybrid C. Adami. I suggested that it must have broken from the exact juncture, and proceeded from a cell of cellular tissue formed by the union of two cells which had been cut through, and had grown into one; and which, therefore, belonged to the two different plants, half a cell of the tissue of C. purpureus having been spliced to half a cell of C. Laburnum. The necessary consequence would be, that a bud formed from that compound cell would derive qualities from both species, but

qualities less fixed and innate than those which are derived from generative union. This has been looked upon as a speculation, but I consider it nearly amounting to a certainty; because I think that the consequence is necessary, and that the phenomena cannot be accounted for in any other manner; and nothing of the kind has been known to occur to any known mule productions, vegetable or animal. * * * I think that clever gardeners might thus obtain crosses between plants which will not intermix seminally. * * * Of course, many failures must be expected before a bud will be obtained from a compound cell; but I think with perseverance, it will be produced; perhaps most easily by uniting half of two young stems of equal bulk from just above the root upwards. * * * It must be remembered, that if the smallest piece of bark be inserted into a different stock and lives, whatever bud shall break from its tissue, exhibits the qualities of the plant from which that piece of bark was taken, without regard to the juices, root, or bark of the stock. If it proceeds from the stock, it exhibits its qualities; if exactly from the suture, how can it avoid exhibiting the joint qualities?"

Many "worked" buds of C. purpureus have probably died, as occurred in the instance when the C. Adami was produced, but we hear of but the one case in which the hybrid form has been so originated. Those who enter upon experiments with a view of testing this question, should, therefore, not be too hasty in forming conclusions, even though their first successes may not be very encouraging in their results. We shall be glad to have to record many such experimental trials; meanwhile, vegetable physiologists may discuss the bearing of Dr. Herbert's theory, upon the ascertained facts of cell-formation and development.—M.]

Review, and Miscellaneous Notices.

REVIEW.

Glenny's Handbook to the Flower Garden and Green-House, comprising the Description, Cultivation, and Management of all popular Flowers and Plants, &c. By George Glenny. London: C. Cox.

This work, which was issued in monthly portions, forms, now completed, a neat volume of about four hundred pages. It treats of all the more important of the plants grown for ornament, giving a general summary of their cultivation, and brief descriptive particulars of a select few of the best species of each genus, which feature, as well as some of the articles altogether, appear to be the work of another hand. We must take an example or two:—

"Scilla. A genus of bulbs, for the most part hardy, and ranking among the prettiest ornaments of the early spring. They are far too much neglected in gardens, though of the easiest culture, and very gay appearance at a season when flowers are scarce. They grow very well in any moderately good garden soil, but have rather a preference for soil containing a considerable portion of peat earth; this is especially the case with several of the smaller kinds. They multiply rapidly by means of offsets, and their culture is very simple, for they merely require planting in the autumn, the bulbs being placed from two to four inches under ground, according to their size, and they may then remain year after year, the patches of bulbs increasing in size, until it is required to form new plantations. Except for this purpose, or for the sake of increase, the less they are disturbed the better. There are something like three dozen species recorded as being in cultivation, from which for ornamental purposes the following may be selected: *S. præcox*, blue; *S. bifolia*, blue, pink, and white varieties; *S. sibirica*, bright blue; *S. amœna*, blue; all small dwarf plants, and blooming in succession from February till April; *S. campanulata*, blue, white, and pink varieties; and *S. italica*, pale blue; both of larger size, and blooming about May.

Cheiranthus. (Wall-flower). A genus of plants of somewhat shrubby habit., containing *C. Cheiri*, the well-known common Wall-flower, of which there are various handsome double-flowered varieties cultivated, the best being the double bright yellow, double dark brown, and double purple. The common single is grown abundantly in most common flower-borders, and bears its yellow or brownish blossoms freely in April and May, on plants reared from seeds sown in May of the previous year. The seeds should be sown in a bed of light, or rather sandy soil, and the plants pricked out when large enough into a nursery-bed, from whence they may be transplanted with compact balls of earth about their roots, in the early part of autumn, into the places where they are to flower. When the plants live over to a second year, they are larger; but in general the one-year-old plants are preferable. The double varieties are increased by cuttings, planted under a hand-glass in sandy earth, about May or June, and are best potted and protected through the winter in cold frames, though sometimes established plants will survive the winter if exposed. *C. alpinus* and *C. ochroleucus* are two pretty dwarf plants, with pale yellow flowers in April and June, suitable for rock-work or small beds, or the front parts of borders, quite hardy and increased by cuttings. *C. mutabilis* is a tall, rather straggling shrub, which has changeable purplish flowers, like a single Wall-flower, early in spring; and requires the protection of a frame, or common cool green-house.

There is an extended calendar of operations for the Flower Garden and Green-house; and a very elaborate Index, descriptive of all the plants mentioned in the volume. The Handbook thus becomes a very useful book of reference, for those who take pleasure in the management and cultivation of their own plants and gardens. The original plan of the book seems to have included the shrubbery, which has, however, been but partially executed.—M.

MISCELLANEOUS NOTICES.

New Syrian Apricot: Kaisha.—Fruit of this was sent to the Horticultural Society, on July 21, 1848, by J. Warmington, Esq., of Kensington, accompanied by the following note:—"I take leave to send you a couple of Apricots from one of Mr. Barker's Syrian trees, which has borne, for the first time, this year, and carried twelve fruits to maturity—rather too many for its size. I know not if it possesses any advantages over the common sort, but it certainly is early. Some of the fruits were ripe on the 12th of July; and, on the same wall where these ripened, were Moorpark and Turkey Apricots perfectly green and hard." The tree was sent to Mr. Warmington, by John Barker, Esq., from his garden at Betias, near Suedia, in the Pachalick of Aleppo, where he states, there exist thirteen varieties of Apri-

cots with *sweet kernels*—this is one of them; and the sweet-kernelled Apricot of Ispahan, or "*Shuker Para*," (*Journ. Hort. Soc.*, iii. 228), is another. The fruit is roundish, five inches and a-half in circumference, rather deeply and acutely channeled on one side near the base, the channel becoming less, till only like a shallow indented line as it approaches the summit, where it terminates in a slight depression formed round the base of the style. The fruit is semi-transparent. Skin slightly downy, pale citron-coloured where shaded, tinged and marbled with red next the sun. Flesh tender, juicy, of a clear citron-colour, parting freely from the stone, sugary and delicious, like well-refined lump-sugar, combined with the Apricot flavour. Stone small, roundish: kernel *sweet*, like a nut. A valuable early variety for the dessert; and probably excellent for preserving; if it be employed for this purpose, the transparency of its flesh will exhibit a new feature amongst Apricot preserves. By its clear citron-coloured flesh, it may be distinguished from the orange-fleshed varieties hitherto known in this country, some of which have likewise sweet kernels, such as, the Breda, Musch-Musch, and Turkey. It is earlier than either of these.—*Thompson in Journ. Hort. Soc.*, 1849.

Fluid Secretion of Nepenthes.—"The parietes of the leaf of Nepenthes distillatoria are traversed by a multitude of proportionally large anastomosing veins which contain many true spiral vessels. The upper half of its inner surface is covered with a blue rind, as parts often are which require to be protected from the action of water; the under half is, on the contrary, shining and full of gland-like eminences, directed downwards, and having a hole almost visible to the naked eye, which is uncovered by the cuticle which the remainder possesses." The watery secretion reaches generally to the level of these glands in the middle of the ascidium; and they are thought to be true secreting organs. This peculiar structure alone gives a strong reason for thinking that the water in the ascidia of Nepenthes is supplied by the plant itself; and the circumstance that water is found in pitchers which have never been opened is another argument against the supposition that it comes from without. The analysis of the fluid, moreover, leaves no doubt that it is a true secretion. I could not detect any oxalic acid in the fluid of Nepenthes. It is stated in *Lindley's Vegetable Kingdom* that Dr. Turner found this acid in combination with potash, and that he also detected a trace of organic matter, which caused the watery fluid when boiling to emit an odour of boiled apples. Though I have examined the water of many pitchers, from four different localities, and paid particular attention to the detection of oxalic acid, I have failed in finding a trace of it; and I am therefore inclined to believe that Dr. Turner, on account of the minute quantity of solid matter which he must have got on evaporation of the water, was unable to subject the minute crystals which he took for super-oxalate of potash, to a further examination, which would have shown him that the crystals were not super-oxalate of potash, but chloride of potassium. The proportion of chloride of potassium which I found in the fluid is considerable; it is deposited from the liquid, after evaporation, in the form of minute but very regular cubes. The odour of boiled apples I found very distinct when the water was heated to the boiling point. Besides chloride of potassium, I found malic and a little citric acid, in combination usually with soda, lime, and magnesia, and a small quantity of another organic matter, which gave a yellow tint to the water during its evaporation. The quantity of the latter was too minute to enable me to ascertain its chemical nature.—*Dr. Voelcker, in Trans. Bot. Soc. Edin.*, iii. 234.

NEW AND RARE PLANTS.

Trichoglottis pallens, *Lindley.* Pale-flowered Trichoglottis. (*Journ. Hort. Soc.*, v., 34.)—Nat. Ord., Orchidaceæ, § Vandeæ-Sarcanthidæ.—A curious, dwarf, stove epiphyte, of little beauty. The leaves are oblong-distichous; the flowers lateral, usually solitary, not quite two inches across, pale yellowish green, with brown spots, and an oblong white lip, with a shaggy crest on the upper side.—From Manilla; introduced about 1848. Flowers in autumn. Duke of Devonshire.

Libocedrus chilensis, *Endlicher.* Chilian Libocedrus. (*Journ. Hort. Soc.*, v., 35.)—Nat. Ord, Pinaceæ, § Cupresseæ.—Syn., Thuja chilensis, *Don;* Thuia andina, *Poppig.*—An arbor-vitæ-like evergreen tree, of great beauty, growing in its native country from thirty to forty feet; or, according to some authorities, sixty to eighty feet high. It has the habit of the American arbor-vitæ, but is less robust, sometimes branching from the base and acquiring the habit of a cypress, in other cases forming a conical head. The young branches are compressed, but mostly hidden by the leaves. The leaves are blunt, keeled, glaucous at the sides, green at the back and edges, standing in two pairs crosswise, the lower pair much larger than the upper, which resemble two tubercles. The cones are drooping, short-stalked, half an inch long, consisting of four woody scales, which stand crosswise in very unequal pairs. Its hardiness has not yet been ascertained; it has been grown for some years at Elvaston, but has been sheltered in winter.—From Chili: colder valleys of the Andes; introduced about 1840, and recently by several nurserymen. Mr. Low, of Claptou; Messrs. Standish and Noble, of Bagshot; and others.

Microsperma bartonioides, *Walpers.* Bartonia-like Microsperma, (*Bot. Mag.*, t. 4491).—Nat. Ord., Loasaceæ, § Loaseæ.—Syn., Eucnida bartonioides, *Zuccarini.*—A showy annual, with flexuose, succulent hispid stems, a foot long. The leaves alternate, ovate acute, lobed and serrated. The flowers form a kind of lax, leafy panicle; the corolla consisting of five obovate acute petals, about an inch long, sulphur yellow, within which stands a forest of stamens, also yellow, on filaments longer than the petals. A half-hardy plant, suitable, from its succulent, tender nature, only for sheltered situations out-doors in summer, or for the greenhouse.—From Mexico; introduced in 1848. Flowers in summer. Messrs. Booth, of Flootbeck Nurseries, Hamburg.

Pentstemon heterophyllus.

PENTSTEMON HETEROPHYLLUS.

Nat. Order, Scrophulariaceæ & Antirrhinideæ.

Generic Character.—Pentstemon, *L'Heritier.—Calyx* five-parted, with distant solitary bracts. *Corolla* ventricose, bilabiate, the orifice generally pubescent. *Stamens* didynamous, with the rudiment of a fifth, which is usually filiform and bearded on the upper side; *anthers* separate, glabrous, ciliated or downy. *Capsule* ovate, two-celled, two-valved, many-seeded. *Seeds* angular.

Pentstemon heterophyllus, *Lindley*. Variable-leaved Pentstemon.—Suffruticose; leaves glaucescent, entire, linear-lanceolate, upper ones linear; peduncles 1-2 flowered; sepals ovate acuminate; corolla ventricose, beardless; anthers sagittate, fringed at top.

Synonymy.—Pentstemon heterophyllus, *Lindley, in Bot. Reg.*, t. 1899.

Description.—A handsome sub-shrubby species, growing from a foot and a half to two feet high; branches minutely tubercular, with crystalline papillæ. Leaves opposite, quite entire, glaucescent from the presence of numerous small, whitish tubercles, linear-lanceolate on the lower part of the stems, where they are from two to three inches long, more linear and shorter above. Flowers in a racemose panicle; peduncles 1-2 flowered, from the axils of the small upper opposite linear bract-like leaves; and having a pair of small bracts above the middle. Calyx small, the sepals ovate-acuminate. Corolla large and showy, of a pretty pinkish lilac colour, beardless; the tube for about one-third of its length at the base is narrow, suddenly ventricose; anthers fringed at the top, sagittate, sterile filament glabrous, sub-emarginate.

History.—This pretty Pentstemon was originally found by Douglas, in California, and was introduced by him in 1834. Subsequently it became lost to our gardens, and was reintroduced a year or two since, in company with P. azureus and P. cordifolius, by Mr. Hartweg, who found it in the valley of the Sacramento river, in Upper California. It is one of the evergreen, sub-shrubby section, requiring to be perpetuated by cuttings; and, like most of the evergreen species of the genus, though comparatively hardy, cannot be safely trusted to withstand our winters. A supply of young plants should, therefore, be struck during summer, and preserved in cold dry frames during winter, for planting out in the following season. Our drawing was made from a plant which blossomed in the nursery of Messrs. Henderson, Wellington Road, St. John's Wood, during the summer of last year.

Culture.—The Pentstemons are among the most showy of the genera of hardy herbaceous plants. Some kinds are truly herbaceous, dying down to the ground annually; others are more or less shrubby in their habit, and this is the case with the subject of the present notice. They will flourish in any good garden soil, but prefer a rather rich light loam, which is also, when mixed with decomposed leaves, a good compost in which to plant them for preservation in pots during winter. They are better adapted for mixed borders of choice flowers, than for beds or groups.

Early in the summer, cuttings of the young shoots should be planted in sandy soil, and placed under hand-glasses in a shady situation. These, when rooted, should be potted separately into small pots, and well established and hardened before winter. To this end, as soon as they begin to grow, after being separately potted, they should be set out on a gravel walk, or some other dry open spot, where they will get starved into hardiness of constitution by the absence of all excess of moisture at the roots, and rendered bushy in growth by frequent topping of the branches. In this condition they are well suited for preservation during winter in cold frames, free from accumulating dampness; the pots should be plunged, so as to protect the roots as much as possible; and while they are fully exposed all the day in fine weather, the ordinary protection afforded by the frame and light will be abundantly sufficient for them at night, except in case of very severe frost, when a garden-mat must be added. These plants may be planted out in April, or early in May, and should come into flower by the end of June, or the beginning of July. Seedlings of this Pentstemon are liable to produce variations from the type.—M.

The name of this genus is derived from *pente*, five, and *stemon*, stamen; the fifth stamen being present and conspicuous, although sterile. This condition renders the genus interesting in an organographical respect, since it thus forms one of the links, or degrees of diminution of the staminal whorl, from the normal number 5, corresponding to the sepals and petals, to the two which occur in Veronica.—A. H.

ON GROUPING ROSES FOR THE FLOWER GARDEN.

By Mr. JOHN SAUL, Durdham Down Nursery, Bristol.

THE season is fast approaching when gardeners will once more have to decide what description of plants will give to the flower garden the greatest beauty, fragrance, variety, clearness, and contrast of colours, with continuity of bloom for the longest possible period of time; and, not only are these qualities essential, but it is equally necessary to ascertain what class of flowers will give the greatest pleasure and satisfaction to the greatest number of persons. Were this last question proposed to me, I should answer, unhesitatingly, Roses.

The Rose is no longer a summer flower, for we now have autumnal bloomers, surpassing, if possible, in colour, beauty, and fragrance, our former favourites of June. Other classes of flowers, such as the Pelargonium, the Fuchsia, &c., have each its own admirers. On the other hand, there may be found those who will say of some plants, however beautiful, "I don't much care about this; it is not a tribe I much fancy." But has this ever been said of the Rose? I think not; I have never yet heard of any person saying, "I don't admire Roses!"

If Roses, then, are such general favourites, how comes it that they have not received that extensive cultivation which they deserve? for it must be admitted that in very few gardens they have received it. Is it because they are difficult to cultivate? Certainly not; no flower requires more simple treatment. Perhaps it may be in part caused by the long catalogue of varieties from which both gardeners and amateurs are puzzled how to select. With this in view, I will proceed to mention a few really good flowers—some of them old sorts—which are adapted for grouping, and which, from their excellence, cannot fail to give satisfaction to those who may cultivate them.

In the flower garden we formerly had annuals, grouped in abundance to adorn, or, rather, disfigure it. These have given way of late to a more beautiful class of plants, which are annually bedded out, such as Scarlet Geraniums, Fuchsias, Calceolarias, Petunias, &c.; and, with as much propriety, may some of these make way for the grouping in the flower garden of the more beautiful of the Autumnal Roses; for what can surpass or even equal the dazzling beauty of a bed of Geant des Batailles, Grand Capitaine, &c.; or the magnificence of clumps of Baronne Prevost, La Reine, and Souvenir de la Malmaison, &c.; or the extreme beauty and delicacy of masses of Mrs. Bosanquet, Eliza Sauvage, &c. The following varieties are well suited for this massing system of culture:—

HYBRID PERPETUAL ROSES.

1. *Baronne Prevost.*—Bright rose colour, a very large flower, strong, vigorous, free grower, blooming freely from June till November. Always opens its blooms well, whether in the heat of summer or the cold damp weather of November. Well suited for a large clump. A most magnificent Rose.

2. *Dr. Marx.*—Rich carmine colour, large flower, strong, robust grower, opening its flowers freely both in summer and autumn. Will make a splendid dark mass. A very beautiful Rose.

3. *Duchess of Sutherland.*—Mottled rose colour, bright and clear; free, vigorous grower, will contrast with Dr. Marx, or Geant des Batailles. A beautiful flower.

4. *Geant des Batailles.*—Dazzling crimson, the nearest approach to scarlet in this class; very free grower, and one of the most abundant bloomers, flowering from June to December, and invariably opening its blooms well. It will contrast well with any of the light flowers which follow. A bed of this under a bright sun is almost too brilliant for the eye to rest on.

5. *La Reine.*—Brilliant glossy rose, very large, has the appearance of a true perpetual Cabbage, but much larger; strong robust grower, and free bloomer. This, like Baronne Prevost, forms a magnificent clump. A grand flower, well worthy of its name.

6. *Madame Laffay.*—Bright crimson, very fragrant; free, vigorous grower, and an abundant bloomer from the end of May till the middle of December. Expands its flowers well, and never fails to give them in abundance. One of the most useful of Roses, and admirable for a clump.

7. *Standard of Marengo.*—Brilliant crimson; will, I doubt not, be equal to the Geant des Batailles, but is as yet rather scarce.

8. *William Jesse.*—Lilac crimson, a large and fine flower, strong grower; forms a splendid mass.

BOURBON ROSES.

9. *Boquet de Flore.*—Bright carmine; opens freely, and blooms profusely from June to November; a strong vigorous grower, and admirably adapted for a mass. A very fine and striking Rose.

10. *Comte d' Eu.*—Brilliant carmine, very showy, and continues to bloom well through the summer and autumn; a moderately strong grower. Forms a lovely bed. Distinct and very good.

11. *Enfant d' Ajaccio.*—Scarlet crimson, very bright; a moderately strong grower. Its only bad quality is, that it will not open well in hot summer weather, but in autumn it is truly brilliant; the rains of October appear

not to affect it in the least; I have seen it at this season, and as late as the middle of November, a sheet of dazzling bloom. Very beautiful and good.

12. *George Cuvier.*—Rosy crimson, fine shape, expands its blooms freely, a moderate grower. Distinct and superb.

13. *Grand Capitaine.*—Velvety fiery scarlet, very brilliant; opens its flowers well both in summer and autumn; not very double; dwarf habit, well adapted for a small bed, where the intense brilliancy of its flowers will show to advantage. One of the most distinct of Roses.

14. *Pierre de St. Cyr.*—Glossy rose, fine large flower, expands well and blooms profusely; a most robust grower. Will form a splendid clump to contrast with any of the strong growing Hybrid Perpetuals. A superb Rose.

15. *Queen.*—Fawn-colour shaded with salmon, very sweet scented. One of the first and last in bloom, which invariably expanding its flowers well, which appear in profusion. Rather dwarf habit, but will form a lovely small clump. Distinct and beautiful.

16. *Souchet.*—Purplish carmine, large flower and a good dark variety; indeed, one of the best of this class for the purpose; moderate grower, expanding its blooms with freedom. Superb.

17. *Souvenir de la Malmaison.*—White with fawn centre, very large and magnificent, flowering freely through the summer and autumn, strong grower. This will make a gorgeous clump, in contrast with such Roses as Baronne Prevost, La Reine, &c.

CHINA ROSES.

18. *Archduke Charles.*—Light rose changing to brilliant crimson, a profuse bloomer, moderate grower. One of the best changeable Roses. Unique.

19. *Clara Sylvain.*—Pure white, a superb flower, blooming freely from June till the end of October; moderate grower, suited for a small bed, and the best white for the purpose. Beautiful.

20. *Eugene Beauharnais.*—Beautiful bright lake, a free bloomer through the summer and autumn. One of the hardiest Roses in this class, as well as one of the best dark varieties, free grower, splendid in a small clump. A charming variety.

21. *Mrs. Bosanquet.*—Creamy white; I have heard amateurs call this "the Wax Rose," from its loveliness; a profuse bloomer from June to November, moderate grower. This Rose appears intermediate between the Chinese and what are called Bourbons. Will form a small clump. If possible more unique and beautiful than any other variety. A truly splendid Rose.

TEA-SCENTED ROSES.

22. *Adam.*—Rosy blush, very large and magnificent, with beautiful camellia-like petals, blooms freely, moderate grower, rather tender, and needs slight protection in winter. Suitable for a small mass. Very fine.

23. *Comte de Paris.*—Creamy blush, a large fine flower, blooming abundantly, growth moderate. A very desirable variety, forming, in a bed, a lovely mass. Superb and very distinct.

24. *Devoniensis.*—Creamy white, buff centre. Shall I say the most beautiful of Roses? It has now become so well known as scarcely to need description. Fragrant as well as beautiful. A clump of this is one of the loveliest objects in a flower garden.

25. *Elisa Sauvage.*—Cream with deep orange centre, profuse bloomer, and the best yellow for a small bed. Dwarf, delicate habit, requiring, and well deserving, a little protection in winter. An extremely lovely flower.

26. *Safrano.*—Deep fawn, very lovely in the bud, a free flowerer, and a moderately strong grower as a Tea-scented Rose. Being more hardy than Elisa Sauvage, where that variety is considered tender, or the clump large, this should be used. A very unique and beautiful Rose.

NOISETTE ROSES.

27. *Aimée Vibert.*—Pure white, blooming in immense clusters, very showy. There being a scarcity of good white Autumnal Roses, this will be found useful to group in contrast with the strong growing Bourbons and Perpetuals, in large clumps; using Clara Sylvain, with more dwarf varieties, in smaller beds.

28. *Narcisse.*—Pale lemon; a beautiful flower, blooming in abundance. This is a Tea-scented Noisette, of moderate growth, and rather tender, requiring slight protection. Will form a beautiful small clump. A very first-rate Rose.

29. *Ne plus Ultra.*—Creamy white, fragrant, dwarf habit, blooming in large clusters. Like Narcisse, a Tea-scented Noisette, but more hardy than that variety. Will contrast admirably with any of the dwarf dark varieties, such as Grand Capitaine. A very desirable and beautiful Rose.

30. *Ophirie.*—Bright gold and salmon, a strong grower, blooming in rich abundance from the early summer until the approach of frost; even the wet and damp of autumn appear only to give a deeper tint to its lovely flowers. Indispensable, from its colour, for a large clump where this colour is wanting. The other yellows, which are free bloomers, are of too delicate growth, and only adapted for small beds. Pegged over a large clump, which it should be, what an unique mass it forms in the flower garden! Fragrant and very distinct.

This list will be found ample from which to select. The varieties named are all free bloomers, and of first-rate excellence, flowering until arrested by the approach of frost. If grown in masses in the flower garden, planting but one variety in a bed, and well contrasting the colours, they will be found

far more pleasing, as well as more beautiful and fragrant, than the majority of plants at present so employed.

I will just add one or two hints on their cultivation in the flower garden—they are not intended as more than hints. If the natural soil is of a tenacious loam, it will be sufficient to well enrich it with any strong manure, such as night soil, slaughter-house dung, or any similar strong manure. On the contrary, should the natural soil be very sandy or poor, I should recommend a portion to be taken out, and the bed filled with rich, stiff, fibrous loam, or any such soil that may be at command; well manuring, as in the other case, and thoroughly working up the mass to a couple of feet in depth, mixing the ingredients together. The natural soil, I take for granted, is drained; stagnant water about their roots is as injurious to Roses as to any other plants. The distance which they should be planted apart is variable, and must depend on whether the variety is a weak or a strong grower, or whether intended to be pegged over the bed, or grown as a bush. In the latter case, they will require a greater distance than in the former. In a general way, I should say, the strong sorts, if to be pegged down, should be two feet apart each way; and if grown as dwarf bushes, from two feet and a half to three feet; dwarf, or moderate growing varieties, a foot and a half if pegged down, or from two to two and a half feet if grown as bushes. In some gardens the pegging down system is indispensable, whilst in others this is immaterial; as amateurs wish to see the beauty of their Roses growing individually as dwarf bushes.

Roses, of the classes I have selected, require, in a general way, but little pruning. The delicate growers require to have the head regulated in winter, and any dead wood cut out. The strong growers, at the same season, should have the gross and weak shoots taken out, shortening the others moderately, and regulating the head. In summer, as soon as any strong shoots are perceived not likely to flower, the points should be pinched out; and the laterals from these in general bloom well. This applies to all. As soon as the first bloom is over, cut the dead flower stalks back to the next well developed bud, but not too far back; for if this is done the branch will not break freely, whereas in the former case it will soon push out abundance of fresh flowering shoots. Give abundance of liquid manure during the growing season. There is no fear of green centres in any of the Roses I have selected; nor is this a failing common to many of the autumnals.

ON FLOWER BORDERS.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

IF I may judge from repeated questions on the subject of this paper, persons, particularly amateur gardeners, are often puzzled how to fill those little narrow borders which are often found along the fronts of houses, and often also along the fronts of greenhouses and conservatories. "Mine," says one, "is a very nice, warm border, with a south aspect, and I want to fill it with something very nice and *recherché*: not common things. What should I select?"

This question is not an uninteresting one to either amateur or professional gardeners; and may, I have no doubt, be answered in a variety of ways. My present object is to point out the elegibility of such borders for the very interesting assemblage of plants enumerated below. There may, perhaps, be other better ways of filling such borders, but I can vouch for the beauty and interest of this.

The border must be well drained, and filled to the depth of nearly two feet with light rich soil, composed of sandy loam and leaf mould, to which may be added a little very much decomposed manure; but the loam should predominate. Close to the wall, at distances varying from two to three feet, plant the dwarf growing varieties of tea-scented, Noisette, and other continuous blooming roses. I will mention a few, but the sorts may be very much varied according to taste; they must not, however, be the rank growing kinds, only such as will bear frequent thinning and pruning, because on this will depend a continuous and profuse bloom. I recommend Elize Sauvage, La Pactole, Adam, Mirabile, Strombio, Solfaterre, Victoire Argent, Reine des Vierges, Camellia Blanche, Pink Noisette, Aine, Odorata Blandescens, Princess Valorie, Ida, Gloire de Rosamenes, Bouquet de Flora, Yellow China, White China, Devoinensis, Androselle, Queen.

Between these, and near the wall, plant Lilium japonicum, sibiricum, Thunbergianum, longiflorum, and speciosum album; Alstrœmeria pulchella, Van Houtii, aurea, Hookerii, and psittacina; Gladiolus gandavensis, insignis, cardinalis, and psittacinus; Amaryllis Belladonna; Camassia esculenta. Then along the other part of the border, between the roses and the edge, put in Ixias, Tritonias, Watsonias, Sparaxes, and the allied genera—a tribe of plants very much neglected, and generally considered tender; but in such a situation, if planted five or six inches deep, they will flower exceedingly well, —better even than in pots. With these intermix the beautiful Anomatheca cruenta, and juncea;

Hesperoscordum lacteum; Calochortus venustus, and splendens; Viesseuxia, or Morœa pavonia; Sternbergia lutea; Oxalis floribunda, divaricata, Boweana, Deppii, violacea; and from what I hear, O. elegans would be a delightful addition. Also, here and there introduce a patch of Tigridia pavonia, and conchiflora. Such a border, with a little peat added at the spot, will be suitable for zauschneria californica; also, Anemone japonica, and japonica hybrida.

I could enumerate many other good things, but enough is here offered to select from. I will just observe, that temporary or permanent vacancies may, during the summer, be advantageously filled up with some of the best dwarf growing bedding plants; with here and there a plant of the Pelargonium odoratissimum, and others of that class. The plants named in the above selection are all highly interesting, and many surpassingly beautiful, and a portion of them would be in flower from early spring until severe frosts; but the roses will generally form the chief attraction, being almost always in bloom where the situation is warm and sheltered. On the approach of severe weather, the whole border should be covered with a layer, four inches thick, of decayed leaves.

Sacred Botany.—The Lentil.

LENTILS, which appear to have been formerly extensively cultivated in the East, as they are in some parts at the present day, are several times mentioned in our version of the Bible. The Hebrew *adashim*, which is so translated, is generally admitted to be correctly rendered, and the Arabic name *addas*, is, it appears, still applied to the Lentil in Syria. The plant is the Ervum Lens of botanists, a leguminous herb, whose seeds are used as pulse, being chiefly employed in making a kind of pottage; though sometimes, as appears from Ezek. iv. 9, in making bread.

ERVUM LENS.

It was for a mess of this pottage of Lentils, that Esau sold his birthright to his brother Jacob. Thus we read—"And Jacob sod pottage." "And Esau said to Jacob, feed me, I pray thee, with that same red pottage." "Then Jacob gave Esau bread and pottage of Lentiles; and he did eat and drink, and rose up, and went his way: thus Esau despised his birthright" (Gen. xxv. 29-34). When David fled before his son Absalom, his friends brought to him, at Mahanaim, "wheat, and barley, and flour, and parched corn, and beans, and Lentiles, and parched pulse" (2 Sam. xvii. 29). Elsewhere we learn, that in one of the engagements between the Israelites and the Philistines, a troop of the latter were gathered together, "for foraging," as the marginal reading tells us, "where was a piece of ground full of Lentiles" (2 Sam. xxiii. 11). The parallel passage (1 Chron. xi. 13) indeed reads barley, instead of Lentiles; but the quotations evidence that Lentils were cultivated in Palestine at an early period, or otherwise in countries whence they were there easily obtainable. In Egypt, according to Dr. Royle, Lentils, anciently as now, formed a chief article of food among the labouring classes; and Pliny, mentioning two varieties, incidentally refers to one of them as being red, that term being extended to yellowish brown. This illustrates Jacob's *red* pottage, the true colour of which would be this yellowish brown, if made of Lentils. Dr. Shaw also states, that these Lentils, which easily dissolve in boiling, form a red or chocolate-coloured pottage, much esteemed in North Africa and Western Asia. Hence the reddish Lentil, now common in Egypt, is probably that referred to in the Scripture texts, though the Lentils of Palestine have been but little noticed by travellers.

The Lentil is a small annual plant, with a weak stem eighteen inches high, having pinnate leaves, composed of several pairs of narrow oblong leaflets, and terminated by a slender tendril. The flowers, which grow two or three together, from the sides of the branches or short peduncles, are pale purple,

and are succeeded by short flat legumes, containing two or three seeds, flat, round, and slightly curved in the middle, which ripen about July. In England it is little cultivated, except as food for cattle.

According to Dr. Playfair, the Lentil contains more nitrogenous matter than any other of the leguminous plants, and is, consequently, more nutritious. A curious proof of its nutritious properties is said to exist in the use made of it by the Hindoos, who add Lentils to their rice diet, when engaged in laborious work. Einhoff obtained, from 3,840 parts of Lentils, 1,260 parts of starch and 1,433 of matter analagous to animal matter.

The Lentil is abundantly used in Roman Catholic countries during Lent and other fasts, both in soups and dressed as haricots. The pulse is imported into England in limited quantities, chiefly for the same object. The Lentil also forms the base of a kind of flour or meal called Revalenta, which has been much extolled for its nutritious properties, and its fitness for invalids.

The Lentil is, however, held to be difficult of digestion; and, when taken in quantities, or without a due proportion of other food, is found to be sub-narcotic. In connection with this subject, it is worthy of mention, that the seeds of many leguminous plants are poisonous, and productive of serious consequences when used as food. This quality pointedly attaches to those of another species of Ervum—E. Ervilia, which are sometimes used.—M.

PROFESSIONAL AND MORAL TRAINING.

HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey," &c.

THE desire to see you rise to some distinction in the gardening world, prompts me to advise you how to proceed for the attainment of that object. To improve in the knowledge of any useful science, it is necessary to have a desire for that particular subject. The desire for gardening, I know you have; no study is more pleasing or instructive. God has implanted in the breasts of all mankind a natural desire for the cultivation and admiration of the fruits of the garden; witness the child pleased with culling bright flowers, or in using its tiny hands in feeble efforts to cultivate them. Even when the love of riches and of power confines men to cities, their natural desires are still strong for the enjoyments of rural life; and in the decline of life, when the different passions by which they have been actuated are subsiding, they retire to the quiet and healthful enjoyments to be found in the contemplation of the works of nature, displayed in the various flowers, fruits, and the manifold beauties of garden scenery. It is a pleasing and instructive study to trace the works of nature up to nature's God. There is a great variety of objects, each produced for some useful purpose, and each forming a link serving to connect the whole of the works of nature into one perfect chain.

Even the colours diffused over the whole face of nature are subjects worthy of your attention. Green is the colour of all others most pleasing and agreeable to the sight; it is on that account that the Almighty Creator of all has clothed the hills and plains with a soft and smiling verdure; and to obviate a sameness in the whole, which would make it difficult to distinguish objects, the verdure of the pasture differs from that of cultivated land, and every tree or plant has a shade or tinge peculiar to itself; thus, the many varieties of the same colour, all tend to diversify and beautify the scene. If white or red colours were spread as generally as green, on the surface of the earth, their dazzling or glaring appearance would be most fatiguing and disagreeable to the sight; and, if black or brown were the predominant colours in nature, all things would appear melancholy, or attired in mourning. Pray, let it be your study, at every opportunity, to notice the appearances that nature displays with each succeeding week. As the present season (winter) is that in which vegetation is comparatively at rest, notes can be taken of the Evergreens, now the ornaments of the pleasure-ground. You may think such attention is unnecessary, and that you can always recollect what trees, shrubs, and plants are Evergreens, and what are deciduous; but, to put your recollection and knowledge to the test, I beg you will make the trial, by writing a list of the names over-night, and then, on going abroad in the morning, you will see many that you had forgotten; and, not improbably, many of which you were uncertain whether they were Evergreens or not, until your attention was so particularly directed to the subject. Mark the varieties of the shades of green, light, dark, glaucous, &c.—all to be registered for the useful object, which you will better understand at some future day, of blending the various hues so as to form a pleasing landscape on the whole.

Miscellaneous Notices.

Climate of Sikkim, India.—Sikkim is more rainy than Bhootan and Nepal, or, at least, more humid. Encircled by hills, it is sheltered from other winds; and the superabundant moisture is not carried off in vapour by the sun, but clogs the valleys, and is again deposited at night, equally intercepting the solar rays and nocturnal radiation; diminishing, in short, the day's heat and night's cold, and producing a climate which all the world over, in the Western Highlands and Wales near home, or on the remote shores of South Chili and Fuegia, is eminently prejudicial to cultivation, whether of grain or fruits. It, moreover, causes the dispersion of the human population, for few parts of a country, so uniform in features, are more favoured than the rest; warmth and comparative dryness are sought in the narrow valleys and their southern exposed slopes, above which the heated vapours are raised by the morning sun, to be condensed on the cooler mountain forests, whose murky atmosphere, and dark dripping vegetation, the poor Lepcha peoples with the bad spirits of his demonology.

I do not think that the similarity of these features in the Himalaya of Sikkim, with those of the other far-distant countries mentioned, and their mutual effects upon organized life in both, exist in my own fancy; it is farther traceable in the native vegetation, and is eminently conspicuous in the paucity of animal life, especially quadrupeds and birds. My attention was irresistibly called to the subject before I had ascended 6,000 feet of my road to Darjeeling; and, to the present hour, I am more struck by this fact than by the many grander and more novel phenomena which these mountains present. I am everywhere reminded of the damp west coast of Tasmania, of the New Zealand islands, of the humid portion of extra-tropical South America, of the Hebridian Islands, the north-western coast of Scotland, and some parts of Wales. A scattered population, rude cultivation, a damp atmosphere, and dripping sky; no summer's warmth nor winter's cold, no genial ray of spring, no dog-star nor summer's sun, no harvest moon, crisp frost, or sparkling Christmas. The ground never chirps beneath the tread; the falling leaves decay, but do not rustle under foot. All animate nature is deadened; the forests are quiet, or the few birds that cry utter a mournful note. Magnificent as is the vegetation, exuberant in species, rich in colouring, profuse in the rarest and most delicate forms, of temperate and tropical climes combined, these productions are not the children of a joyous spring; or, if of spring at all, surely the illegitimate progeny of a churlish season; they are smuggled into existence unacknowledged by blue sky and bright sun, heralded by no birds, cropped by no beasts; they bud, and flower, and fruit, heedless of the dashing rain and oppressing fogs.—Dr. Hooker, in *Journal of Botany.*

Calochortus.—This is a genus of liliaceous plants belonging to the north-western portion of South America, and extending over all the Mexican plains. They are of a simple bulbous structure, having ensiform sheathing leaves. The flowers, which are handsome and pretty, grow in the manner of a simple umbel or raceme; they are generally of a purple, yellowish-white, or violet colour. The genus is composed of two divisions, viz., *Calochortus* (Pursh), characterised by the perigonium having sub-calycinal, linear, beardless, external leaflets; those in the interior, petaloid, somewhat unguiculate, much broader than the outer ones, and hairy in the interior; and *Cyclobothra* (Don) in which the perigonium has the leaflets sessile, nearly equal; those of the interior being shorter and hairy. These divisions have been disregarded by some botanists. The name Calochortus is derived from two Greek words—καλὸς, *kalos*, beautiful, and χόρτος, *chortus*, herb, which signify literally, *beautiful herb.* Baron Karwinski, travelling in Mexico, collected the species of this genus; and the dried specimens, transmitted to M. Von Martius and the late Zuccarini, were sent to Dr. Schultes, at Landshut, (Lower Bavaria,) who described eight species, in a paper inserted in the fourth volume of the *Bijdragen tot de Naturkundige Wetenschappen*, an excellent scientific Dutch journal. The Calochortuses require a peaty, sandy soil, which should be used at the re-potting in February or March. Plenty of drainage is indispensable. They may be grown in a cold frame, or even in the open ground. In a state of rest they should not be watered, but, when they begin to grow, watering must be frequently attended to; care must be observed not to subject them to excess of moisture; and they must be kept from frost in the winter.—*Ghent Annales.*

HORTICULTURAL SOCIETY.

March 19.—The most interesting of the subjects of exhibition was a plant of the curious Cypripedium caudatum, from Mrs. Lawrence, of Ealing Park. This plant had much the habit of the Clivea nobilis, in the disposition of its two-ranked strap-shaped leaves, a foot or more in length. The flowers, which grow upon simple stalks as high as the leaves, are not attractive in their colour, the sepals being a kind of dull cream colour, green towards the tips, the petals, a dull purple greenish at the base, and the lip also a dull pale purple, with deeper veins; the most curious feature in the flowers is the length of the narrow tail-like petals, which, in this instance, were nearly a foot long, and were stated to have attained this length gradually after the first development of the blossoms. A large silver mepal was awarded to it. Messrs. Henderson, of the Pine-apple Nursery, sent a large admirably flowered plant of Acacia diffusa, trained without formality into a conical form; and with it a small plant of an Epacris, called hyacinthiflora candidissima, the largest and best of the white-flowered kinds of the impressa habit; Boronia triphylla, one of the prettiest of the Boronias; and a red-stained variety of Eriostemon caspidatum, called rubrum. Messrs. Henderson of the Wellington Road Nursery had a handsome dwarf Gesnera called macrantha purpurea, with rich scarlet flowers, said to be a hybrid between Cooperi and macrantha. They had also a plant of the Conoclinium ianthinum, an ageratum-like plant, which from its free-flowering habit, will probably be a useful

plant for ornament; Siphocampylus lanceolatus, a species of upright habit, with lance-shaped leaves, and deep salmon-pink flowers; and an Erica, named Burnettii, in the way of elegantissima. Mr. Iveson, gardener to the Dowager Duchess of Northumberland, sent the Odontoglossum hastilabium. Among numerous showy plants from the garden of the Society, were the Acacias —celastrifolia, ixiophylla, and lineata; a beautifully bloomed plant of the yolk-coloured Epidendrum aurantiacum; and a small plant of the dark purple-blue Hovea chorozemæfolia.

Mr. Fry, of Lea, Kent, exhibited a simple apparatus for fumigating plant houses, on the principle of the common flower-pot plan of fumigation, which may be recommended for its usefulness rather than its novelty.

NEW AND RARE PLANTS.

Callistemon brachyandrum, *Lindley*. Short-flowered Callistemon. (*Journ. Hort. Soc.*, iv., 112.)—Nat. Ord., Myrtaceæ, § Leptospermeæ.—A handsome stiff-growing, evergreen, greenhouse bush, with many

round pubescent branches, bearing narrow, linear, pungent, channelled leaves, conspicuously dotted beneath. The flowers grow from the axils of the leaves towards the end of the branches, forming short, loose spikes; the stamens, little tufts of crimson threads, which, form the conspicuous part of the flowers, are short, much shorter than in any other known kind, being not more than twice as long as the small inconspicuous petals; the threads are tipped by golden-yellow anthers.—From Australia: north coast; introduced in 1843. Flowers through the summer months. Horticultural Society of Loudon.

Epidendrum funiferum, *Morren*. Thread-petalled Epidendrum.—Nat. Ord., Orchidaceæ, § Epidendreæ-Læliadæ.—A pretty stove epiphyte, having erect, slender, terete stems, eighteen inches to two feet high, bearing, on the lower part, alternate sheathing, oblong-lan-

ceolate, acuminate leaves; and along the upper part, the numerous, short, drooping racemes of flowers. These latter are small, rich orange-colour, with a white centre, the sepals are ovate, acuminate, spreading; the petals thread-like, as long as the sepals, at first adhering to the sides of the two lateral sepals as far as the middle, but afterwards being separated nearer to the base, and ultimately becoming contorted like a cork-screw; the lip is three-parted, the side lobes serrated, the central one ligulate, and notched in the middle.—From Brazil: St. Catherine's; introduced to Belgium about 1847. Flowers? ——

Espeletia argentea, *Humboldt* and *Bonpland*. Silvery Espeletia. (*Bot. Mag.*, t. 4480.) - Nat. Ord., Asteraceæ, § Tubulifloræ-Senecionideæ.—Native name, *Frailejon*.—A curious greenhouse shrub, (in a wild state three feet high,) with stout woolly stems, bare below, but surmounted by a tuft of spreading leaves, which are a foot long, narrowly lance-shaped, and densely silky on both sides. The flower heads grow on a corymbosely-paniculate, nearly leafless, densely silky stem, five to six feet high; they are rather more than an inch in diameter; the rays yellow, with a brownish disk. The plant has a terebinthine odour, and yields a copious gum resin. It requires a dry greenhouse. From New Grenada: on the mountains, ascending to near the snow line; introduced, in 1845, by Mr. Purdie. Flowers in summer. Royal Botanic Garden, Kew.

Camellia Drysdalii

CAMELLIA JAPONICA, Var. DRYSDALII.

Nat. Order, Ternstromiaceæ, ♀ Camellieæ.

Generic Character.—Camellia, *Linn.*— *Calyx* without bracts, 5-9 sepalled, sepals imbricated in 2-3 rows, the interior by degrees larger, deciduous. *Corolla* with 5-7 hypogynous, imbricated petals, the interior larger. *Stamens* numerous, hypogynous, in several rows, often adhering to the bottom of the petals, more or less coherent together at the base; *filaments* subulate; *anthers* incumbent, 2-celled, oblong, with a rather thick connective, cells bursting longitudinally. *Ovary* free, 3-5 celled; ovules 4-5 in a cell, inserted alternately on the central angle, pendulous; *style* 3-5 toothed; stigmas capitellate. *Capsules* 3-5 celled, indebiscent or loculicidally 3-5 valved, the valves bearing the septa in the middle, central axis persistent, the faces bearing the seeds.—(*Endlicher Gen. Plant.*)

Camellia japonica.—*Linn.* Leaves ovate, acuminate, acutely serrate, flowers terminal, sub-solitary. Varies with flowers simple or double; red, white, yellow, and variegated.

Var.—Drysdalii. Drysdale's Camellia.—A rose and white striped, full-double variety.

HISTORY.—This very beautiful and finely-formed rose striped Camellia is a seedling raised several years back, by Messrs. Drysdale & Co., nurserymen of Glasgow, in whose hands the entire stock of plants is at the present time. We understand it is a very free blooming kind, and, being distinct, will no doubt be found an acquisition to every choice collection of these beautiful plants. A full detail of the proper method of cultivating the Camellia would occupy more space than we can spare in this place; we therefore introduce a summary of the points which constitute a perfect Camellia.

THE PROPERTIES OF THE CAMELLIA JAPONICA.

By Mr. G. GLENNY, F.H.S.

WE cannot perhaps at a better time offer a few remarks on this subject, than when the portrait of Messrs. Drysdale's new variety is given to the floral world; for, although we have not seen the original, the artist's sketch induces us to believe that it is a step in the right direction, and, at all events, pictures a new and distinct variety with many good qualities. We do not attempt to copy the words of the volume published under the title of "The Properties of Flowers and Plants," nor, indeed, have we the book to refer to, but when we reflect, that not a law is there laid down, that is not founded on principle, we cannot err, though we describe in other words, or, perhaps, from habit, something like the same, those points which, acording to our notion, constitute perfection. The Camellia japonica is, perhaps, one of the most beautiful of flowering evergreen shrubs, a favourite with everybody, interesting in all its stages of growth and bloom, and, beyond description, magnificent, when well grown and flowered. The most awkward and imperfect of the varieties and species is noble in some stage—for instance, when the buds are opening, and before they are forward enough to disclose their imperfections; but we are every year enriching the family with new varieties, which of late years have become favourites or otherwise, in proportion as they advance towards the desired model. The standard we desire to see attained, comprises the following important features:—

First. The flower should be perfectly round in its outline, and form half a globe on the face.

Second. The petals should be smooth on the edges, free from the slightest indenture or serrature, and thick as well as firm in texture.

Third. They should imbricate, that is, the centre of one petal should cover the part where the two under petals lap or cross each other, and this should continue to the centre, each row of petals rising sufficient above the other to form a globular face.

Fourth. As a consequence, there should be perfect symmetry, uniformity, and order, prevailing throughout the flower.

Fifth. The plant should be short-jointed, so that the growth would be shrubby and compact, the blooms should be at the ends of all the shoots fairly beyond the foliage which should hide the stems that are beneath it, and present a bright surface of dark green.

Sixth. Although large flowers are desirable with large foliage, small blooms would be as valuable when the leaves are small in proportion, therefore no size can be defined as preferable.

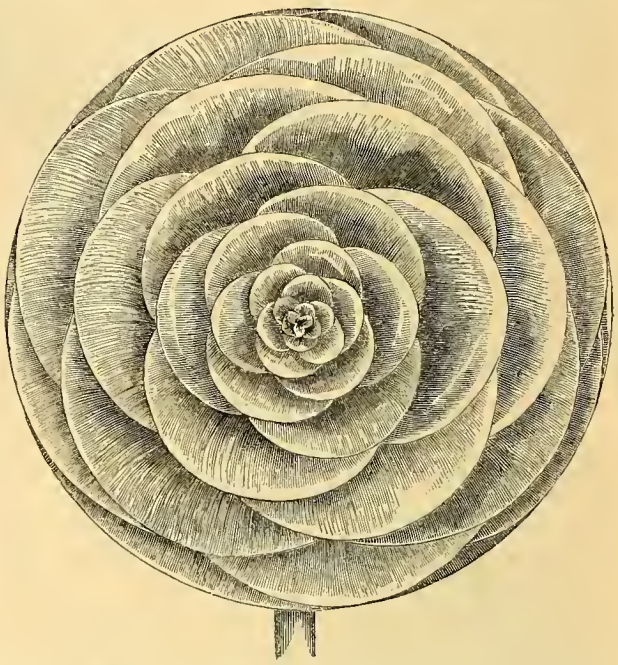
Seventh. As regards colour, taste must have its enjoyment; but, whatever shade it may be, it should be dense and decided, from pure white, through all the grades of rose-colour, to deep scarlet, the preference being given, on this point, to novelty, where other claims are equal.

Eighth. With respect to variegated flowers, whether blotched or striped, the colours should be well defined and positive, with even edges where they meet, and not clouded or shaded into one another.

Ninth. The plant should be bushy, and the foliage close, down to the rim of the pot, no bare stem should be seen, and the specimen should be all round alike, that is, all sides should be close and good.

We may be told that all these points are not easily attained, but, if the artist has been fortunate in a likeness of Mr. Drysdale's novelty, we have a very near approach to some very important features

which are rather rare. In the first place, it is more round than many present favourites; next, the edges of the petals are very smooth, and exhibit neither the points that are conspicuous in some, nor the indentations, which are natural to others, and these are very valuable characteristics. Next, we have stripes much better defined than we can produce them in most other striped varieties, exhibiting some of the character of a flaked Carnation, and sufficiently distinct to lead us to hope that other flowers will be found still more beautiful, for we need hardly tell our readers that the Camellia will sport a good deal, occasionally giving us plain flowers, at other times showing a good deal more white. Again, if we look to the face, it would seem that the petals, though smaller as they near the centre, are as smooth and as perfect as the outer ones; and this, be it recollected, is a point which many of our present favourites have not, for they are in most varieties less perfect as they are farther removed from the outer edge, and in the centre differently formed, and, in many cases, absolutely shapeless, and altogether imperfect. To give an idea of the effect where the flowers are really small, let us look at Sasanqua rosea, let us imagine those little flowers as perfect as many larger ones, and we could hardly picture a more handsome specimen than it would be if well grown; but then the flowers are ragged and uncouth, so that, unless it is too far off to see the defects in the form, it is excessively ugly. Myrtifolia would be a beautiful variety, if the petals were as well formed as those of the portrait in the present number, but they are pointed. The Double White is nearly always indented so as to exhibit the petals heart-shaped. Eximia long considered a first-rate variety is pointed in the petal; and Imbricata is not much better. The striped white varieties, such as Press's Eclipse, Punctata, Rosa Mundi, King, and others of that kind, are for the most part undefined. The Countess of Orkney is, perhaps, the best of the light striped sorts. Tricolor, though pretty in its markings, or stripes, is of a most worthless form. All the "Anemonefloras," and "Altheifloras," are as unworthy of cultivation as any we have seen. Reticulata is, in our estimation, good for nothing, with flowers as uncouth as a large semi-double poppy, and joints so long, that it is impossible to grow a compact plant; it has long ceased to be valuable except as a stock. We have only mentioned a few that are familiar to most persons, or we might fill a volume; but there are others so flat on the face, as to appear very poor and mean, and others so notched as to be perfectly ugly. Of those in cultivation, now, we prefer Hafilda, which goes by a dozen other names, to almost any we have seen, not less for its superior form than for its delicate peach colour, and its manageable habit. We shall be glad to see Messrs. Drysdale's new variety well grown and bloomed, for we must regard it as an acquisition, and a valuable one, if it comes up to the portrait, and of this we have no right to doubt.

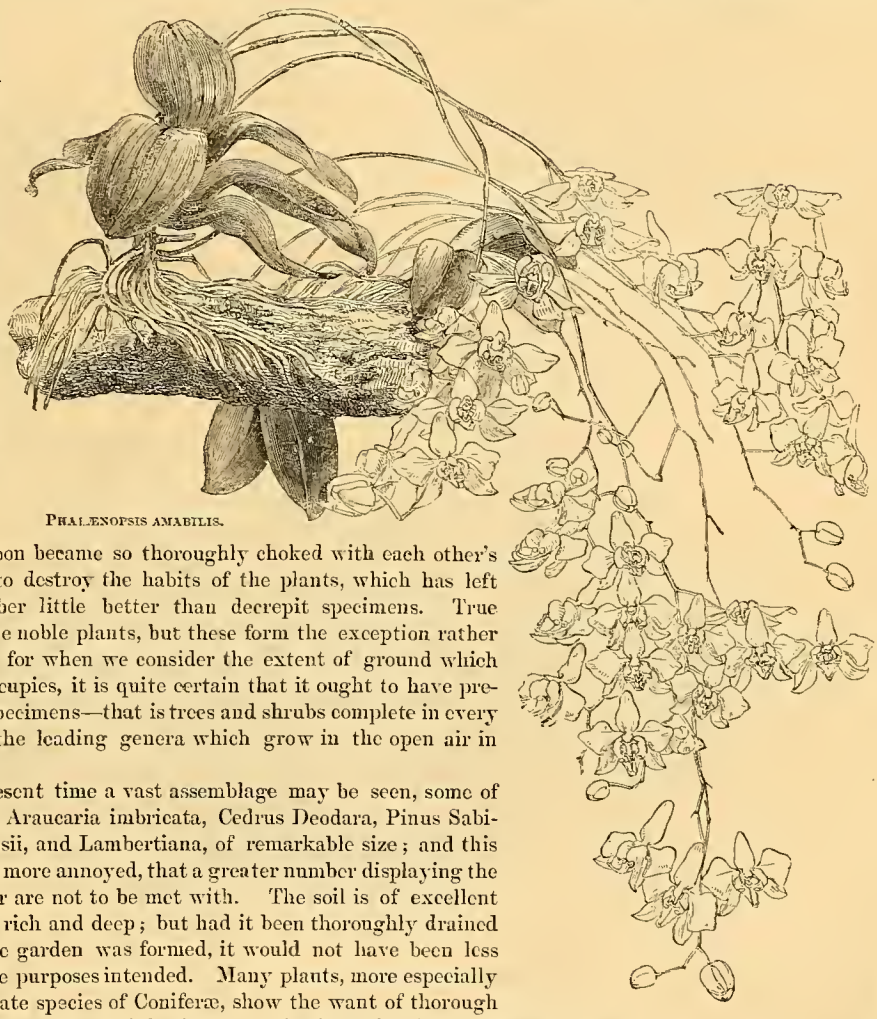


VISITS TO REMARKABLE GARDENS.

The GARDEN of the HORTICULTURAL SOCIETY, CHISWICK.

ESTABLISHED many years since for the promotion of science, the Garden of the Horticultural Society has long attained an European celebrity, not less for its magnificent collection of fruits, than for the splendid exhibitions of both fruit and plants, which have annually been held there. Situated upon a dead level, the view is confined to its own grounds, and, therefore, for picturesque

effect has little to recommend it; and, as if to make bad worse, the original designers displayed so little taste in laying it out, as to render the Arboretum at the present time little better than a forest scene, where, but for the smooth turf, the exotic character of the trees, and marks of cultivation, and design in the walls and buildings, a stranger may fancy himself in a primeval forest, for, despite the magnificent increase which the plants had made for a number of years, they soon became so thoroughly choked with each other's branches, as to destroy the habits of the plants, which has left a great number little better than decrepit specimens. True there are some noble plants, but these form the exception rather than the rule, for when we consider the extent of ground which the garden occupies, it is quite certain that it ought to have presented good specimens—that is trees and shrubs complete in every part—of all the leading genera which grow in the open air in this country.



PHALÆNOPSIS AMABILIS.

At the present time a vast assemblage may be seen, some of them such as Araucaria imbricata, Cedrus Deodara, Pinus Sabiniana, Douglasii, and Lambertiana, of remarkable size; and this makes one the more annoyed, that a greater number displaying the same character are not to be met with. The soil is of excellent quality, being rich and deep; but had it been thoroughly drained at the time the garden was formed, it would not have been less suitable for the purposes intended. Many plants, more especially the more delicate species of Coniferæ, show the want of thorough drainage, as do also some of the fruit trees in the orchard and kitchen garden.

At the present time some important improvements are going on under the direction of Mr. Glendinning, and it affords us great pleasure to congratulate the council and garden committee upon the step which they are making at last in the right direction. Those who have been in the garden of the Society, and who have been to the Chiswick Fêtes, are aware that a broad walk runs from the main entrance gate to near the Council Room, that a set of long narrow beds, edged with box, with walks scarcely wide enough to be usable, formed what was called "The Flower Garden" on the eastern side of the garden, and that the tents for the exhibitions in the season, are placed near the large conservatory. Well, at a right angle with the broad walk before mentioned, another walk of the same character, passing through and destroying the flower garden, and terminating opposite the end of the large conservatory has been formed; and at a right angle with this walk, another of the same dimensions, leading to and terminating at the conservatory, is in course of formation. At the east end of this walk, a new entrance to the garden is to be formed, which, in addition to its more commanding and appropriate position, will afford visitors the means, on wet days, of visiting the exhibition tents and the conservatory, without being exposed to the "pittiless peltings of the storm," and walking over the shoes in water, as has been frequently the case within the last four years. This is an improvement which we doubt not will be appreciated by the visitors to the garden. At the

LÆLIA SUPERBIENS.

angle formed by the meeting of these walks, two large circles, surrounded by raised beds with grass sides, have been formed, and in the centre of each circle, we presume a large vase or basket filled with flowers will be placed; or should the members of the Society ever feel disposed to commemorate the founders of the Society, Sir Joseph Banks, and Thomas Andrew Knight; or gardeners, the memory of Mr. Loudon, more appropriate places than these could not be found for such mementos. The sides of the walks are also to be embellished with raised flower beds, with pillar Roses, &c., &c. Much, however, as we approve of this alteration, we cannot quit the subject without entering our protest against the formation of the walks. The ground is not excavated in the ordinary way, but only a few inches in depth at the sides, so that the walks, when completed, will be almost entirely above the level of the surrounding soil. The object, we presume, is to lay them dry and to shoot the water upon the grass instead of carrying it away by drains or cesspools, as is customary; but, as a matter of taste, it is, to say the best of it, a great mistake.

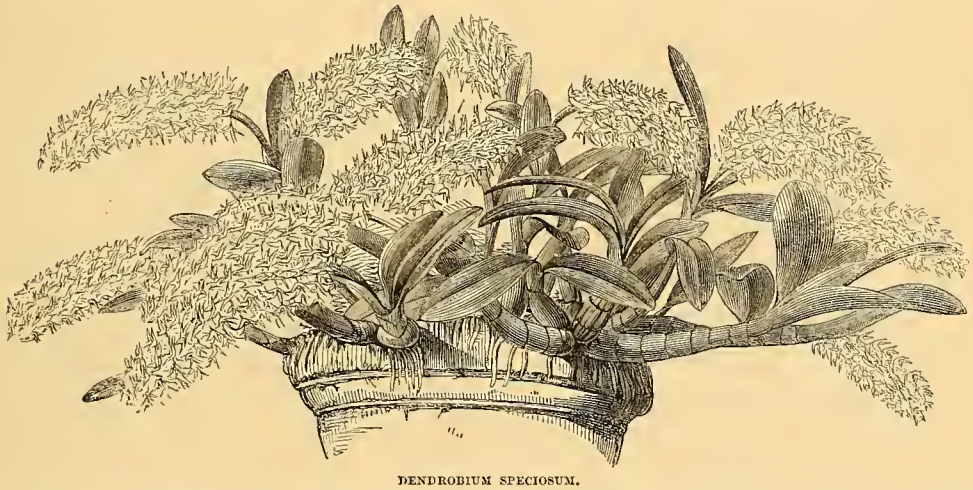
Walks, though indispensible in gardens, do not necessarily form leading features in the same, but merely form means to an end, that end being the enjoyment of the varied scenes of a garden at all seasons of the year; therefore, walks should not be obtruded in the scene, but should rather have a retiring aspect. Now, these humpbacked walks will be seen from every part of the garden, destroying

the breadth of feature of the lawn, and fixing the eye in anything but an agreeable way; besides, they are rounded so much, that to walk upon them in comfort, it is necessary that one leg should be longer than the other. We are, and always have been, advocates for shallow edgings, and walks brim full of gravel; but we have no notion of placing them entirely above the level of the surrounding ground—such an arrangement is unnecessary; walks may be made firm, and dry without it, if proper means are taken, and drains are formed to carry away the water.

But we must leave this unpleasant part of the subject and hurry on to the plant-houses, for these at this season, are the most interesting, and from them we have borrowed a few illustrations.

Most people who take an interest in horticultural affairs, have heard of the magnificent specimens of Phalænopsis amabilis, sent by Mr. Fortune, from Java; and of Mr. Hartweg's splendid mass of Lælia superbiens, which has long decorated the entrance to the curvilinear stove. Another plant, scarcely less remarkable, was Dendrobium speciosum growing in the old Pine stove.

The Phalænopsis amabilis, is represented on a preceding page. It is growing upon a large block of wood, and, at the time we saw it, had nearly fifty of its large waxy pure white flowers fully developed, with hundreds of buds in various stages of growth. The plant was suspended from the rafter, at the cool end of the house; and, as a matter of course, was in superb health. In the same house—the Orchid house, which, by the way, is very much too small to do justice to the plants it contains, we also noticed Dendrobium discolor, a not very attractive species, from New Holland, and of coarse



DENDROBIUM SPECIOSUM.

growth; D. cucullatum with pendent pseudo-bulbs and simple but gay flowers; and a remarkably fine variety of Oncidium Cavendishianium. It has rarely been our pleasure to see a collection of Orchids in such splendid condition as these are at the present time. Not an unhealthy plant is to be seen; and every part of the plants, the stages, pots, and house are as clean as the most fastidious could desire. The same remark is applicable to the whole of the plant-houses, which were gay with flowers, as if it had been May-day, and the whole of the plants were in a remarkably clean and healthy condition, reflecting great credit upon Mr. Gordon, who has now had the charge of them for several years.

Passing through the Greenhouse, gay with forced bulbs, &c., and entering the Curvilinear Stove the monstrous plant of Lælia superbiens presented a most gorgeous appearance, rivetting the attention, and bidding the wondering wanderer stand. Those who have been at the great metropolitan exhibitions have seen gorgeous sights in the Orchid tents, but they never saw anything so truly and decidedly grand as this noble plant. Suspended upon a huge branch, just at the proper height to bring the flowers upon a level with the head of the spectator on entering the house, the flowers were shown to great advantage. This plant, which is of great size, came originally from Guatemala, whence it was sent by the Society's collector, Mr. Hartweg; and there the poor Indians collect the flowers to decorate their cottages. The plant in question is six feet in diameter, and the flower stems were nine feet in height, of which there were nine averaging ten flowers each, and each of the flowers were several inches in diameter, and of a mixture of white, lilac, crimson, and orange colours. The engraving (p. 148) gives a reduced, but very good representation of the plant; and when it is considered that each truss of flowers would cover nearly two pages of this Magazine, some idea may be formed of the magnificence

of its appearance. In the same house we noticed remarkably fine plants of Franciscea latifolia and uniflora completely covered with bloom; the gay Inga pulcherrima, with its crimson bottle-brush-like flowers; and a number of plants, in fine bloom, of Gesnera zebrina, one of the most useful plants in cultivation for winter decoration.

Passing to the Old Pine Stove, now used for Stove plants and Orchids, we found the third subject of our illustrations—Dendrobium speciosum. This plant comes from New Holland, and has been grown to its present size in the garden of the Society; it was growing in a pot, and was six feet in diameter; bore eighteen noble spikes of flowers, each spike averaging from seventy to eighty flowers. It is true, this number is very much less than the number of spikes produced by the Rev. Mr. Chawner's plant, but the flowers here were much finer, of better colour, and altogether in more healthy condition. We had made an extract, on the proper management of this plant, by Dr. Lindley; but, as space admonishes us, we must transfer it to the miscellaneous notices in a future number. In the same house were some well-grown plants, of a very considerable number of kinds of Begonia, and the stages were gay with Gloxinias, Gesneras, Hippeastrums, &c. A singular Orchid, Spiranthes cerina was producing a quantity of dull brown flowers, and its beautiful foliage was just beginning to form. With this we also noticed Lycaste cruenta, and the singular pale green-flowered species, L. ciliata. A new Justicia-like plant, of free growth, the Cyrtanthera aurantiaca, was producing several spikes of dull orange-coloured flowers, not very striking, but still sufficiently showy to be worth adding to a collection as a winter-blooming plant; and the rare Barnadesia rosea was just going out of bloom. The little span-roofed Greenhouse, generally devoted to soft-wooded plants, was gay with Cinerarias, Pelargoniums, &c., &c. In Hetley's House, in addition to a number of rare seedling Conifers, among which Juniperus flaccida, and the Japanese pinus, P. excorticata, which throws its old bark almost like a Plane tree, were not the least remarkable, we noticed the female Garrya in full bloom, which proves not so fine a thing as the male variety—the catkins being very much smaller; Nuttalia cerasiformis, a rare shrub, producing a profusion of small white flowers, and a very fine herbaceous plant, Helleborus olympicus, the flowers being tinged with purple.

We have a number of notes upon plants in the Conservatory, and other parts of the Garden, but these we must reserve for a second notice.—A.

Miscellaneous Notices.

Growing Orchids from Seeds.—At the present time, there are few subjects connected with plant growing on which there is less recorded information than that of growing Orchids from seeds. I am not aware that there is any case on record of hybridisation having been effected among Orchids, though there seems no doubt that such could be accomplished by careful manipulation, an inference I draw from reasoning analogically on experiments made here to get seed. Many of our indigenous Orchids appear to seed freely, whilst comparatively few exotic species among our cultivated collections produce seed, circumstances suggestive of the idea that the latter require artificial assistance, which can be readily afforded, by carefully applying the pollen masses to the viscid face of the column and rostellum. But whether the seeds of hardy Orchids be generally imperfect, or the necessary circumstances for vegetation, and the subsequent growth of the young plants wanting, we certainly do not find crops of young Orchids growing spontaneously in various stages of growth, as occurs with most other endogens, though, when Orchid seed does vegetate under favourable circumstances, a very large number of the myriads of extremely minute seeds contained in the ovaries are perfect, whether artifically impregnated or not. Within the last five years, seedlings of the following species have been raised in the Orchid-house at Glasnevin, namely, Epidendrum elongatum, and crassifolium, Cattleya, Forbesii, and Phaius albus, the seeds of which all vegetate freely. The manner of sowing the seeds, and treating the young seedlings, has been to allow the fine dust-like seed to fall from the ovaries as soon as they show symptoms of ripeness, which is readily known by the ovaries bursting open on one side. When this takes place, they are either taken from the plant and shaken gently over the surfaces of the other Orchid-pots, on the loose material used for growing them in, or on the pots prepared for the purpose, after which, constant shade, a steady high temperature, with abundance of moisture, are all requisites which are absolutely necessary to insure success. In the course of eight or nine days after sowing, the seeds, which at first had the appearance of a fine white powder, begin to assume a darker colour to the naked eye, and, if looked at with a Codrington, or even a simple lens, evident signs of vegetation may be perceived, which increase until the protrusion of the young radicle and cotyledon takes place, which varies from a fortnight to three weeks. From this period of their growth, the young plants grow rapidly, and the rootlets lay hold of whatever material is supplied to them. If the seeds happen, either accidentally or intentionally, to be made to vegetate on bare wood, as in some instances has been the case, the young roots extend themselves in different directions, adhering closely to the bark, and make great progress compared with the growth of the stems, thus affording beautiful examples of the manner in which epiphytical plants fix themselves so firmly on the highest boughs of lofty trees in tropical forests, as well as ac-

counting for the isolated positions they frequently occupy in their natural state. The principal difficulty to contend with in rearing the young seedlings has been found to consist in their treatment during the first year, particularly the winter months, when they are very liable to perish, if anything approaching to extremes of moisture, draught, cold, or even heat be permitted; though a steady medium of all these requisites is necessary. The second year's growth has been one during which the plants made much progress, and the only two kinds which have been brought to a flowering state have bloomed the third season. These are Epidendrum crassifolium, and Phaius albus.—*D. Moore, in Gard. Chron.*

THE GARDENERS' AND NATURALISTS' CALENDAR FOR APRIL.

Conservatory.—During the present cold and parching weather, it will be necessary to ventilate cautiously, more especially near newly potted plants, or delicate and tender flowers, and particularly those from the stove, orchid, or forcing house. Now, however, that the plants are beginning to grow, it is necessary that air should be freely admitted, and therefore it will be better that a little extra firing should be used, than that the plants should become drawn for the want of air. Too much attention cannot be devoted to cleanliness. Every plant, and every pot, and, indeed, every part of the Conservatory, should be perfectly clean, and at all times; and if they are not so at present, lose no time in making them so. Camellias, and all plants with large, coriaceous leaves, should be washed clean with a sponge, and, if necessary, soft soap, and keep a scrutinizing eye upon insects of all kinds. Maintain a moist growing temperature by syringing lightly every morning with clean tepid water, and sprinkle the stages and vacant parts of the house, once or twice in the middle of dry days, to generate a moist atmosphere. When strong winds prevail, ventilate principally by the top-lights, but lose no opportunity of giving front air when the weather is suitable. Towards the end of the month, if the weather is mild, a little night air may be left on; that is, after the house has been shut up for a few hours, and syringed, a little air may be given to one or two of the lights before leaving for the night. Acacias, Camellias, &c., which are going out of bloom, must have their dead flowers removed, and if they require pruning and regulating, this is the proper time. Renew the surface soil down to the roots of the plants with light rich compost—previously, if the soil is dry, giving the soil a good soaking of liquid manure. Many of the finer kinds of Boronias, Leschenaultias, Chorozemas, Podolobiums, Tropæolums, &c., will now be in a fit state to remove to the conservatory. Place them in the most airy part, and to prolong their season of blooming, shade them on bright days. Regulate the growth of Climbers, and give them a good soaking of manure water. Maintain a temperature of 45 to 50 degrees by night, rising 10 or 15 degrees in the day time.

Orangery.—To do justice to the Citrus family, the temperature should not fall below 50 degrees by fire heat during the night, and should rise to 60 degrees by the same agency during the day, with ten or fifteen degrees extra by sun heat. Syringe the plants morning and evening, and damp the heating apparatus twice or thrice a-day, especially in the evening. Take care that the plants are perfectly free from insects and filth of all kinds. Any plants that are in bad health, or have been recently imported, should be shook clean out of the old soil, have their roots washed quite clean, and be potted into very small pots, in light rich soil, liberally intermixed with leaf mould and sand. Plunge the pots in a gentle bottom heat of 80 degrees, syringe so as to keep the wood almost constantly moist, but water cautiously at the root until the plants get into free growth. If the stems are very much bark-bound, make an incision through the bark, and continue it from the surface of the pot to the extremity of the strongest branches. It may also be necessary to wrap the stem with damp moss. When the plants are in free growth, water freely with weak liquid manure.

Forcing Flower House.—Continue to introduce Roses, Pinks, and American plants for forcing, and remove those in bloom to the conservatory. A few more Achimenes, Gloxinias, Gesneras, &c., may be started, and those growing must be potted and attended to immediately. Syringe daily, and guard carefully against insects. Temperature 55 to 60 degrees by night, rising 70 or 80 by day, with plenty of air at all favourable opportunities, but carefully avoiding cold draughts. Plants that have been forced and have done blooming, must be carefully protected until the return of mild weather. A.

Orchid House.—Now that the growing season has arrived the whole tribe of Orchids will enjoy a good steaming every clear morning, with the exception of such as are wanted to be kept back. These should remain cool and dry; let them have but little sunshine, and no cold draughts. By this means they may be retarded several weeks where needful for exhibitional purposes. Be cautious with the syringe for the present, until all the Dendrobiums, Aërides, Saccolabiums, Camarotis, and Vandas, have put forth their bloom spikes at the least an inch or two, when they will be all the better for a thorough soaking in tepid water, taking care at the same time to rid all the baskets, pots, and blocks of all kinds of vermin. After this the syringe may be applied regularly, but with care, and using at all times water at least as warm as the atmosphere of the house, the temperature of which may now be allowed to range as high as 70 to 80 degrees by day, and may safely and beneficially be allowed to go down as low as 60 degrees by night. Admit a little air on all favourable occasions, when it is externally mild. Continue potting all such as need it, as soon as they show signs of growth. Look the plants over every day, and water singly all which require it; but avoid watering over head until the pseudo-bulbs are well formed, otherwise they are very apt to damp off in dull weather. We would here remind cultivators of this lovely and curious tribe of plants, that, where good, light fibrous peat is not to be procured, the plants do equally well in good, sweet sphagnum moss, mixed with lumps of charcoal and crocks. To make this house as enjoyable as possible, everything must be neat and clean, and kept in its proper place.

Stove.—Follow out former directions, and where there is convenience give to all young Stove plants the aid of bottom heat, giving at the same time plenty of air in mild weather, and keep them as near to the glass as possible. Keep them well stopped back and staked out, and give to each plenty of room. Give a sharp look out for all sorts of noxious vermin, and destroy them. Keep the atmosphere moist, and attend to the training of climbers that need it. See that all plants in pots are frequently turned, in order that the plants may have

the benefit of sun and air on all sides. Look well after all fast growing plants, as Clerodendrons, and mind they do not suffer for want of water and pot-room, and give them a gentle syringing over head about twice a-day in bright weather. Wake up a few more Gloxinias, Gesneras, Achimenes, and Gloriosa superba.

J. G.

GREENHOUSE HARD-WOODED PLANTS.

The house should now be gay with good plants of Boronia pinnata, Hoveas, Acacias, Chorozemas, Gnidia pinifolia, many varieties of Epaeris, Genistas, Pultenæas, &c., which, if well grown, will make a fine display. Any of the slow-growing plants that have not been potted must be attended to as they seem to require it, which a careful observer will soon find out. A few plants of Correas, of the best sorts, should be shifted, and placed in a good situation; they will be very ornamental next winter. Styphelia tubiflora is also a nice plant for the same purpose.

Gardoquia Hookerii is a beautiful plant for flowering during summer and autumn. To grow it successfully it should be kept in a moderate heat all winter, beginning with young plants every autumn, shifting and stopping them while growing as they require it. Pot them into their flowering pots about the end of March or beginning of April, and place them in the greenhouse after they have rooted into the new soil. Although it is now too late this season to make large specimens, still some healthy bushy little plants will come in very useful, if they are shifted and encouraged with a little heat. They should not be stopped at all after they are placed in the greenhouse.

Mirbelia speciosa (the purple-flowered kind) is rather a refractory plant to manage well; it does best in a sheltered, but light, part of the house; be careful not to overpot it. The different sorts of Leschenaultias and Aphelexes are very subject to a sort of green fly; it is so small that it generally escapes notice until it has done much mischief. The plants should be examined closely, and should any trace of the insect appear, they must be fumigated at once. Large specimens that are showing bloom, if not already shifted, should be left until they commence a new growth after flowering, as disturbing them now would be likely to injure the opening buds. Towards the end of the month some of the earliest cut-back Epaeris will be ready for a shift. After potting keep them a little close for a fortnight or so until they begin to grow, when they must have plenty of air to make them hardy enough to stand out of doors. Where practicable it is an excellent plan to put the smaller specimens into a three-light frame or similar situation; they are more easily managed, and it gives room in the house for the larger and blooming plants. Do not stir the surface-soil about in newly-potted large plants, as it sometimes becomes so dry and dusty that the water will not pass through it; for if one side of it gets quite dry, it is troublesome to bring it into proper condition again. We have lost many a fine plant from this cause. Some of the plants potted at the beginning of last month will require stopping and tying out. Attend to cutting in those plants that require it, as they go out of bloom. Hard-wooded plants generally thrive best in peat and sand, but for the stronger growing sorts, such as Correas, Genistas, &c., about a third of turfy loam, and sometimes a little well-rotted leaf-mould, may be added with advantage. The finer rooting plants require the peat of a light texture and more sand.

Azaleas.—The bloom buds of these will now be getting forward. If there is a good stock of such sorts as Lateritia, Gladstanesii, Prince Albert, Præstantissima, and some others of the same habit, part of them should be placed on the north side of a wall to retard their blooming, and they will succeed those left in the house. Plants that have been forced should have the seed vessels picked off; they should also be shifted if they require it, and, if possible, encouraged with a little heat. Pot those plants that do not show bloom, but not those that are going to flower.

Camellias. Any plants that are wanted to bloom early next year, should now have a little extra heat to forward them. Keep them all as warm as possible with little air while making their annual shoots, and do not forget to use the syringe freely in fine weather. Should the black fly appear on the young shoots, a good syringing with tobacco water is the best remedy. A little light shading, on bright days, will do no harm; but, if possible, do without it.

Routine.—Shading should be attended to when necessary; the old-fashioned lights, glazed with small glass, require very little, but the large squares, now used, mostly require it; say for plants in bloom, from about nine till three o'clock, and for these in a growing state, from ten till two. Look round in the middle of the day (in bright, dry weather) to see that nothing is suffering for want of water, and to sprinkle the shelves, floors, &c. Clear away decayed flowers every morning, and change the places of the plants in the house occasionally. Syringe early in the afternoon in clear weather, and do not give too much air. J. F.

Heathery.—Complete the potting of large specimens as early as possible, taking care that the ball at the time is in a proper state as to moisture, and that the compost is not too dry. Place the soil firmly in the pot, and drain thoroughly. During the present dry, parching weather, ventilate with caution, especially near recently potted specimens; indeed, ventilation by the front sashes will be best avoided for the present, but give plenty of air by the top lights. Damp the house and stages between the pots, and syringe the plants lightly twice or thrice a-week, if the weather is favourable. Guard against mildew, especially upon the more delicate kinds, such as E. propendens, Massonii, and the like, as changes of treatment are very likely to generate it. Should it appear, dress the plants immediately with sulphur. Look carefully over the specimens, especially those which have not been potted, and see that they are in a proper state as to moisture, or the dry winds of April will soon tell tales upon them. If they do not seem in an uniform state of moisture, probe the ball down to the drainage, in two or three places, with an iron pin; give a thorough soaking of water, and, to make assurance doubly sure, place the pot in a feeder of water for a few hours, so as to thoroughly soak the drainage, where, frequently, many of the most active roots will be found. This minute inspection must be extended to every plant, and continued until you are convinced that the mass of earth in every pot is in a proper state of moisture. Newly potted specimens will also require similar attention and care, but until the roots are in active growth avoid over-watering; at the same time, when watering, take care that the water does not escape by the side of the pot, and without moistening the old ball.

Some of the early kinds, as E. aristata, Hartnelli, &c., will be showing colour; and, where it is necessary to keep them for the May shows, it will be advisable to move them to a north pit, or even to place them behind a north wall on very warm days. Guard cautiously, however, against dust. Other kinds, as some of the ventricosas, vestitas, Cavendishiana, and the tricolors, may, for the purpose of forwarding them, require to be kept rather warm. To bring a collection of plants, with a good head of bloom, to the day, requires considerable watchfulness, and is one of the secrets of success in competition, which can only be attained by extensive practice.

Heath Pit.—Ventilate cautiously here for the present, until the plants get into free growth. Proceed with the potting, if not already completed. Guard against mildew. J. F. C.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—Look carefully to these, for as the season is advancing they will require the most assiduous attention. Water carefully, never allowing large plants to get dry enough to flag, or they will receive a check, which will cause the lower foliage to turn yellow. Too much care cannot be taken to prevent this, as the lower leaves furnish the pots, and add much to the general appearance of the plants. A little manure water may now be given with great advantage, which prepare as follows, using soft water:—Put in a large tub equal parts of cow, horse, and sheep dung, adding a little lime; this must be drawn off carefully to keep it clear; then add soft water in proportion of two to one of the liquid manure—it may be used once a-week for the present, and two or three times as the season advances. Tie out the shoots, and remove all superfluous leaves to admit the air freely. Ventilate freely every favourable opportunity, of course avoiding cold draughts. Syringe occasionally, and shut up early, to promote free growth. Guard carefully by timely fumigation against insects, which will be found a great pest if this is not attended to at the first attacks.

Fancy Pelargoniums.—This class of Pelargoniums being generally very early bloomers, a few of the most forward may be selected and placed in a warm house, when they will be found to grow luxuriantly and flower freely. Give a little weak liquid manure to those which are in free growth, which will greatly assist them, and bring up their gay and lively blossoms. Stop a few for late flowering which will be found a great acquisition for autumnal purposes. Put in a few cuttings of the leading varieties for the same purposes. These with a slight warmth will be found to flower through the winter months, imparting a lively appearance to the greenhouse and conservatory. Be careful not to water any but those actually in want of it, as they are very liable to shank off if this is not attended to. Ventilate freely on warm sunny days, and syringe occasionally.

Scarlet Pelargoniums.—Give these every encouragement to promote free growth, and they will be found to pay for all the labour bestowed upon them, with their brilliant head of flowers through the summer and autumn months. Strike some cuttings now, to grow in 48- or 32-sized pots, that they may be pot bound by the autumn, which will cause them to flower through the winter months. The best kinds for this purpose are Rigby's Queen, Ayres' Gem, Royal Dwarf, and Compactum. In potting use a good rich compost. When rooted water freely.

Cinerarias.—If not done last month sow seeds of these for autumn flowering, and strike cuttings for the same purpose. Grow freely through the summer, and let them be pot bound by the autumn, when they will be found to flower freely, and be most ornamental. Fumigate occasionally, as they are very subject to green fly. Water freely through the summer months.

Calceolarias.—All those which require it should now have a final shift into a light rich compost. Keep them pegged down that they may root up the stem, which will greatly strengthen them. Water cautiously, taking care never to water any that are damp or they will canker at the surface of the soil. Fumigate frequently to prevent the green fly, and ventilate freely every favourable opportunity.

Routine.—A hot-bed may yet be made to strike cuttings of such plants as are required for autumnal purposes. Prick off into a light compost such plants as were sown last month. Give a gentle bottom heat for the present. Give a little air, increasing it as the plants gain strength. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

When we look at certain appearances in Nature, for the purpose of selecting some of her forms and features, to make a display of what is called natural scenery, in a small or large space of ground, we try to combine these natural expressions in such a way, that the head which contrived, and the hand that executed, the pleasing effect, should be lost sight of in viewing the same. But in massed geometrical flower-gardens, there is no attempt to conceal that they are strictly and truly works of art, and therefore the colours should be effectively contrasted, to make it plain that art directed every part. As a massed flower-garden is a home scene, there should be a combination of forms consistent with the style of the house, and a sufficient quantity of undecorated space left, to set off such objects as Orange trees to advantage, that a grandeur of expression may be distinctly seen in every part, notwithstanding the uniformity and variety conspicuous everywhere. In propagating a stock of plants for massing, make choice of decided colours, and avoid streaky colours as you would star-shaped beds; the former will impress you like the beauty of the full moon, and the latter like the same moon reflected on the surface of some agitated lake. Nature's voices are always eloquent, but we must take care how we interpret and apply them.

If gravel-walks separate the beds in the flower-garden, with nothing but box as an edging, cold colours should predominate in the arrangement; on the contrary, if grass divide the beds, warm colours should prevail; but, in either case, much may be done to alter this arrangement, by introducing a border to such beds, so as to contrast with the grass or gravel, keeping the border broad in proportion to the size of the bed, and also to contrast with the central mass. Always remember that a small mass of bright colour will balance a large mass of subdued tint; and that beds of equal brightness will require equal masses. Look at the flower garden from various points of sight (which will exercise the minds of my young friends as much as the solution of a mathematical problem), so that, when it is arranged, the colours may appear at times to cross one another, just as Nature's laws sometimes do—but they are uniform for all that.

Although the ground is very dry for the time of the year, I would recommend the soil, in beds where Calceolarias are to be planted, to be well broken up, to allow the air to permeate every part of it if possible: and a little quick lime may be worked in the soil at the same time, as it was by attending to these two circumstances that our Calceolarias lived last year, while hundreds, I believe, went off from neglecting them. Cut away all branches of trees that obstruct light and air from the flower-garden, if you would have the masses symmetrical, and the colours well developed.

Propagation.—Spring-struck cuttings should be well topped back, and hardened off slowly, so as not to dry up their tissue too much; and, for this purpose, remove those that are well established in their pots, into turf pits or frames of any kind, keeping them near enough to the glass to prevent drawing, without being exposed to the dry north winds. See that there is plenty of dwarf Lobelias and Verbenas, not only for small beds, but for interlacing the meshes of basket work, and also Maurandya, Lophospermum, and such like plants, for training over the handles of baskets, and round the stalks of vases. Divide Campanula carpatica, and sow seeds of the same out of doors; but if wanted to flower early, sow the seed in a gentle hot bed.

Annuals.—Continue sowing these out of doors, some in long lines, to remove when Verbenas come into flower, and others of them in masses, for an early show. Wallflowers, Hollyhocks, Campanula, Valerian, Sweet

Williams, and a vast number of other useful spring-flowering plants, should be sown out of doors at once. Forward all choice and tender annuals, as they may be useful for filling some spot in the flower-garden. J. C.

Rose Garden.—As the month of March has been so favourable for planting, nothing of that work ought to require to be done, except the half-hardy kinds which have been kept during winter in pots. All pruning must be finished early in this month, and very recently planted plants should have a good watering, after which the ground should be well stirred, and left rough (or at least not raked) for the frost and sun to pulverize it. Beds to be planted at the end of this month or beginning of May, with Tea scented, Noisette, Isle de Bourbon, &c., should have the soil frequently turned over to expose it to the action of the sun and frost; in fact, too much pains cannot be taken with the soil now; the future bloom will amply repay for any extra trouble. Watch carefully for insects, and see that no fresh-planted roses are being blown about for want of tying.

Forcing House.—Continue to introduce fresh plants into the forcing house, as they are required. Take care to set them in such a part as they may get plenty of sun and air; for, be it remembered, roses want to be brought on very slowly to get them worth looking at. In short, nothing is more injurious to roses than a high temperature: 45 degrees at night is quite high enough, and 50 to 55 degrees by day, unless it is sunny. Look very closely for insects, and tie the shoots out as they require it.

The following list contains twelve of the most select varieties, where a bed of a sort is wanted of very neat growing roses:—

Hybrid Perpetual: Geant des Batailles, bright crimson, nearly scarlet.
Hybrid Perpetual: Comte d'Eu, brilliant carmine.
Isle de Bourbon: Armosa, bright pink.
Isle de Bourbon: Madame Angelina, pale cream fawn centre.
Isle de Bourbon: The Queen, fawn coloured rose.
Tea Scented: Devoniensis, straw, buff centre.
Tea Scented: Adam, blush rose.
Tea Scented: Niphetos, pale lemon.
Tea Scented: Safrano, bright fawn colour.
Hybrid China: Mrs. Bosanquet, pale waxy flesh colour, nearly white.
Hybrid China: Cramoisie Superieure, bright velvety crimson.
Noisette: Fellemberg, bright rosy crimson.

Twelve stronger growing varieties for larger beds. The following are quite gems:—

Hybrid Perpetual: Duchess of Sutherland, mottled bright rose.
Hybrid Perpetual: Mrs. Elliott, bright lilac crimson.
Hybrid Perpetual: Augustine Mouchelet, deep crimson.
Hybrid Perpetual: Marquis of Ailsa, rosy crimson.
Isle de Bourbon: Souvenir de la Malmaison, pale blush, centre slightly tinted with fawn.
Isle de Bourbon: La Grenadier, bright deep crimson.
Isle de Bourbon: Acidalie, blush white, sometimes slightly edged and shaded with delicate pink.
Isle de Bourbon: Boquet de Flore, rosy carmine.
Isle de Bourbon: La Gracieuse, lovely rose.
Isle de Bourbon: Desgaches, bright rose.
Damask Perpetual: Rose du Roi, bright crimson.
Damask Perpetual: Mogador, brilliant crimson purple.

Twelve very dwarf close-growing varieties that are continually in flower, and exceedingly handsome. The following are quite unrivalled.—

Isle de Bourbon: Ceres, bright crimson.
Isle de Bourbon: Gerson, vivid rose.
Isle de Bourbon: Grand Capitaine, velvety scarlet.
Isle de Bourbon: Menoux, brilliant carmine.
Isle de Bourbon: Paul Joseph, rich crimson purple.
Isle de Bourbon: Proserpine, deep bright velvety crimson.
Isle de Bourbon: Madame Souchet, blush margined red.
Hybrid Perpetual: Dr. Marjolin, rosy carmine.
Hybrid Perpetual: Clementine Duval, bright rose.
Noisette: Miss Glegg, white pink centre.
China: Madame Breon, brilliant rose.
China: Clara Sylvain, pure white. H. M'M.

Arboretum.—The preparation of the sites and mode of planting Coniferous plants having been fully described last month, the operation of planting may be safely proceeded with. The planter of ample means and space will be able (I had almost said, on him it devolves as a duty for the public good) to plant every species as they are introduced, in order to prove how far they are capable of being acclimatized. Little doubt can be entertained as to the perfect hardiness of the North American species, but I fear that we may not yet speak so confidently of the Mexican ones. As there may be many persons who have not space enough to spare to form an extensive Arboretum, yet would like to embellish their lawns and pleasure grounds with a few of the best of these plants, I will append a short descriptive list of a few which, having been thoroughly proved, may be confidently recommended.

Abies Douglasii (The Douglas Fir, from North America, introduced 1826).—This lofty-growing tree, which, in its habitat, attains to the height of 150 feet and upwards, promises to become one of the most magnificent ornaments of the Arboretum. Its rapid growth and the graceful distribution of its splendid foliage, together with the great beauty of its inflorescence, combine to render it one of the most desirable trees of the genus. The leaves, when bruised, emit a most agreeable fragrance. It delights in a cool situation, rather moist than otherwise.

Abies Morinda (The Weeping Spruce of the Himalaya, 1818).—A most appropriate name for a beautiful tree; the drooping habit is caused by the denseness of the foliage, the weight of which causes all the young, slender shoots to droop from the main stems very gracefully. The variety called Smithiana has been by some considered as distinct from Morinda, an opinion with which I cannot agree, as we well know that many species of the tribe will present slight variations of foliage and habit; but to constitute them as distinct varieties can only cause confusion.

Abies Menziesii (California, 1831).—As a contrast to the drooping habit of Morinda, the rigid aspiring habit of this species is very desirable; its growth is rapid, and the beautiful glaucous appearance of the foliage is very striking.

Cedrus Deodara (The Himalayan Cedar, 1822).—This is now becoming as well known as it is highly appreciated, and needs no description. For a small place, I would advise that the planter select seedling plants with a dense and compact foliage, as cutting plants are apt to grow more open and rigid, similar to the Cedar of Lebanon.

Pinus insignis (California, 1833).—No place, however small, should be without this most elegant and beautiful Conifer. The contrast between it and other species is eminently striking, and consists not only in its graceful habit, but also the peculiarly delicate colour of the foliage, particularly in the young shoots. It is a fast grower.

Pinus ponderosa (North America, 1828).—If to the insignis be accorded the palm of graceful, delicate beauty, that of robust grandeur belongs to this, which is truly a magnificent species, and appears likely to become a valuable timber tree. A specimen before me, planted about 18 years, measures five feet six inches round the bole at two feet from the ground. The wood is considered to be specifically heavier than that of any other Conifer, hence its name. As an ornamental tree it is second to none.

Shrubberies.—If the planting or removing of evergreen shrubs has been deferred until this month (a practice which, with a few exceptions, cannot be recommended), the roots must be copiously supplied with water at the time of planting, and the choicer sorts mulched. Rhododendrons are one exception; masses of these may be planted now. A splendid immediate effect is produced with these plants by raising a large mound of earth, and planting thereon; the effect is greatly increased by placing large masses of rock stones around the base of the mound, and planting large bushy specimens on the ground level in front of the rocks; and a few plants of Andromeda axillaris and Catesbæi in the mound, trailing over the stones, produces a fine effect. I have proved the latter end of this month (April), and all the next, to be an excellent time for removing large specimens of Hollies. J. C. R.

Auriculas.—These are now fast coming into bloom, and require every care and attention. The trusses must be thinned of any deformed pips, or where too great a quantity exist, to give uniformity and beauty to the truss. A slight shade of calico, or some other light material, will be very useful in prolonging the season of their flowering. A little weak manure water will, at this time, be found beneficial. Seed should now be sown in shallow pans, lightly covered with fine soil, and placed in gentle heat till up.

Carnations and Picotees.—Those growing in pots will require to have the earth in which they are potted stirred up, and a little new added. See that they are free from wire-worm, or slices of potatoes placed in the soil will be found the best means of entrapping them. Watering with lime-water will prove of great advantage in bringing worms to the surface of the soil, and, by examination, the pots may soon be freed of these troublesome intruders.

Dahlias.—Roots of these not required for forcing, may now be planted five feet asunder, and three or four inches deep in the open ground. Those in heat must have the cuttings taken off as they attain sufficient length, to be struck in bottom heat; and when rooted, potted off, and repotted as they may require it. Watering, shading, and giving air, must not be omitted. Where the plants are weak and spindling, time will be saved by striking the tops, as they will make better plants for blooming than those struck early, unless they have been growing on. *Seedlings*, where there is sufficient space and time, should be potted off singly into small pots; but where this cannot be done, they should be planted round the edges of 6-inch pots, which will strengthen them for their final home.

Pansies growing in pots, under glass, require plenty of air and water, and will be greatly benefited by a little liquid manure once a-week. Side shoots should now be taken off and struck, which will make fine flowering plants to succeed those now in bloom. Those in beds must be secured from wind, the soil loosened, and top-dressed with rotten manure. Slugs will be found troublesome; to entrap which, place a few lettuce leaves about the beds, and examine of a morning.

Pinks and *Hollyhocks.*—Attend to the directions given last month.

Polyanthuses.—Protect from hail-storms and cold winds. Attend to the seedlings, marking only those possessing all the desired properties.

Phloxes.—Plants of these, struck from cuttings, should now be repotted, and by degrees hardened off to their summer quarters. Older kinds, of which roots are growing in the open borders, may now be increased by division. Attend to the potting off the different varieties of P. Drummondii, as soon as large enough to handle.

Ranunculuses.—As these appear above ground, see that they are not misplaced by worms or other accidents. A watering of lime water will be found of advantage in bringing the worms to the surface. As soon as they are safely up, water occasionally with weak manure water, and loosen the soil.

Tulips.—Protect from cold winds, hail-storms, and frosty nights, by netting thrown over hoops, but sufficiently high to allow of light. Mats will also be required when the weather is severe, but then only, as the plants are growing fast, and are greatly injured by too much or too close coverings. T. B.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Pinery.—Directly the principal part of the summer crop are out of bloom, attention must be paid to their swelling, by removing all suckers except what are absolutely required for stock, and where particularly fine fruit is wished for, *all* should be removed. The fruit will require tying to a stake to keep it in an erect position, a circumstance of some consequence where handsome fruit is the object. Means must likewise be adopted to increase the atmospheric moisture, which, if the house or pit is moderately light, will require all your diligence to keep it up to the proper pitch. We are not very partial to much syringing, and dislike raising steam, by pouring water on the hot surface of the heating apparatus. By far the best plan is to provide a constant supply of vapour, from evaporating pans or open cisterns; however, after a hot drying day, the syringe may be used with benefit; our objection is to its indiscriminate use at all times, and states of the weather. Shut up early in the afternoon, and if you have no means of aërating them through the night, give air slightly and early in the morning. Water now when either the bed or pots are the least dry, occasionally giving weak manure water; the night temperature may be 65 degrees, rising to 90 on bright days.

Succession Plants, in pots, will have been potted; if the bottom heat is somewhere about 85 or 90 degrees, and the top heat can be kept between 65 and 90, with a good supply of air and moisture, they will grow just as fast as you wish, particularly if in dung pits. If planted out, they will not make such rapid growth at first; but when established in the free soil, will soon outgrow their pot companions, and their broad leaves and dark colour will then show you they are in comfortable quarters. As, in all cases, Pine plants should be raised as near the glass as is possible, it will be necessary, during bright days in this month, to shade slightly, particularly if the houses are light; the cultivator must be guided by this in applying his shading, bearing in mind it is far better to shade too little than too much. Four hours in the hottest day we consider sufficient, and a double net or thin canvass quite enough.

Vinery.—Grapes beginning now to colour must be kept drier, and have as much air as can consistently be admitted; the night temperature may remain at 65 degrees, unless you want to hurry your crop, when it may be raised a degree or two; the finishing process would, however, (particularly with Hamburgs,) go on all the better, with a temperature of only 60 degrees. Take off all extra growth, and if red spider attack the foliage, coat over the pipes some dull day with a mixture of sulphur and lime, adding a little size to make it adhere to the pipes.

The second crop will now require thinning and the usual routine of stopping, &c. In this and the houses now breaking, much care will be necessary, this severe frosty weather, to prevent the external air coming in immediate contact with the tender foliage. If no means are applicable to admit air, except by the upper sashes,

nail some cheesecloth canvass over the apertures, to break the current, and prevent its injuring the leaves.

When a regular supply of Grapes is kept up by successional houses, bring these on as circumstances require.

Pay particular attention to the borders covered by litter, &c. The severe weather we have experienced will render a turning over necessary, adding fresh material, to keep up a genial heat for some time yet. The present dry weather has been a favourable opportunity for carting in fresh loam for borders, &c., and now is an excellent time for the purpose. As so much has been written on this subject, we refrain from again mooting the question, reserving it for a separate article. J. S.

Figs.—Raise the temperature of the fig-house as the season advances. Continue a humid atmosphere until the crop approaches maturity, then exclude all watering until the fruit is cleared off.

Peaches.—As a general rule in disbudding Peach trees, the bearing wood of the present year should be divested of all shoots, except the terminal one and those issuing from near the base. When a deficiency occurs in any part of the trees, more may be laid in. Always secure adventitious shoots that break from the main branches and are favourably placed, in order that the whole surface of the trees may be furnished with fruit-producing wood. Tie the whole of the young shoots loosely to the trellises, so that the greatest amount of foliage may be exposed to solar influence—a matter of paramount importance during the critical process of stoning the fruit. Thin the fruit to about six inches apart. The condition of a given tree may, however, require a deviation from this rule. If a gross growth be perceived, it will be well to thin as little as possible until the fruit is considerably advanced beyond stoning, which will tend to subdue superfluous vigour. Water the borders liberally if they require it, and complete all operations having a tendency to disarrange the economy of the trees previous to the stoning of the fruit. The temperature of the house must be kept as steadily as possible between 58 and 60 degrees, and avoid sudden rises by sun-heat by ventilating early in the morning. Secure a moist-growing atmosphere by syringing the trees every fine day, and frequently sprinkling the floor of the house. As soon as the stoning is completed gradually raise the temperature and close earlier in the day. Should insects infest the trees the remedies previously recommended, if persevered in, will effectually exterminate them. The same care and attention will be requisite in the management of the secondary house as for the first. Advantage may be taken of the increased amount of solar influence by ventilating more freely, syringing more copiously, and closing earlier.

Strawberries.—Give those that are swelling their fruit liberal doses of liquid manure. Pass the hand gently over the trusses of those that are in flower, for the purpose of assisting the diffusion of the pollen. Ventilate freely and constantly. As soon as the fruit begins to ripen discontinue watering, and place the plants close to the glass to enhance its colour and flavour. M. S.

Cucumber House.—In this department previous directions must be attended to. See that the plants are not over crowded with wood and foliage, and never allow them to bear heavy crops of fruit at one time, as this brings on a premature decay. A few inches of fresh soil over the surface of the bed, when the plants have been in bearing for a time, will greatly benefit them and improve the appearance of the house. Shading must now be attended to, as the sun acts very powerfully; and as cold cutting winds must be avoided, it will be next to impossible to regulate the heat by air without running to either extreme, and doing irreparable damage to the healthy foliage. The shading I use is a woollen net, as it admits a portion of light without the sun's rays acting suddenly upon the plants; the walls and paths must be kept moist by frequent sprinkling with the syringe, and the house should be shut up early in the afternoon so as to increase the temperature by sun-heat from 80 to 90 degrees.

Dung Bed.—Continue to remove all useless and superfluous shoots and leaves, never allowing one leaf to be shaded by another, as that only exhausts the plant to the detriment of the fruit. Continue to earth up and surface the bed, as this keeps a healthy atmosphere. If thrip makes its appearance, the syringe must be applied freely and frequently on hot days. When giving air with such cutting winds as now prevail, I find it a good practice to place over the opening a piece of old mat, so that the air does not rush in upon the plants in a strong current, but is sifted through the small meshes of the old mat. If the linings are very hot, I frequently on hot sunny days run a can of water round the insides of the frames, as it prevents the soil and dung being burned, which is not a condition that suits the cucumber, and is not unfrequently the principal cause of crooked unsightly fruit. Seed must now be sown of the most esteemed short prickly varieties for out-door or ridge culture, which I will enter into more fully in my next. In the meantime, dung and leaves must be collected ready for the ridges.

Melons.—The same attention must be paid in earthing up as for the Cucumber, but the soil must be pressed or trodden in firmer and surfaced over with loose soil to prevent its cracking. I always plant single plants two to a light, and train one shoot to the front and one to the back from each plant, pinching out all other shoots that start from the base of the plant; but never stop the leading shoots until they reach the back and front of the frame. All laterals are stopped at the first joint if they show fruit before the plants are strong enough to bear it. Pinch it out and allow as many of the fruit to come into bloom at the same time as possible, for by so doing the fruit is more likely to swell equally. When the bloom is fully expanded, impregnate the same as for Cucumbers. Avoid dribblings of water; but when necessary give a thorough soaking. Be sure that the plants are kept thin, so that the wood may become firm. If any canker appears upon the collar of the plants, apply fresh-slaked lime.

Vegetable Marrow.—Make a sowing at once of the short-jointed or French Courge à la moëlle, as they will fruit in a frame, and prove very serviceable before the out-door planted are fit for use. W T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

The well-doing of Peach and Nectarine trees greatly depends on the ripeness of the previous year's shoots; it is, therefore, of the highest importance to preserve the young shoots of the current year from injury, so that they may complete their growth, and be properly matured before the dull cold weather of autumn sets in. If the first shoots are destroyed or injured, either by insects or frost, the later growths never get properly matured, unless the trees are growing in a very porous soil, and in a favourable situation. The young shoots are very liable to the attacks of green fly, which, if not destroyed on their first appearance, will greatly retard, and otherwise injure them. Tobacco water is, however, both a preventive and cure for this evil; a slight syringing with it occasionally, will keep the shoots clear of them. With regard to spring frosts, much difference of opinion exists as to their injurious effects on wall trees. There are those who dispute the utility of protecting them in the spring; such persons, I conceive, have gained the chief of their experience in some

favoured locality. It would not be so difficult to reconcile the various statements made on this subject, if all the relative facts were given with the statements. It should be borne in mind that circumstances alter cases: what is beneficial at one place, may not be so at another. Last year was a most trying one for wall trees: the 17th, 18th, 19th, 20th, and 21st of April, we had heavy snow-storms, with hear-frost. The shoots of Peach and Nectarine trees, which were at that time from an inch to two inches long, were completely destroyed. Apricots, which were as large as beans, were frozen through, and turned black. The consequence was, many of the trees died, and those that were left, now show the evils of unripened wood, the sap exuding from every part of the young shoots. Now, had those trees been protected, although the fruit might have suffered, the trees themselves would not have been so much injured as to cause their loss. As much, or more, mischief is done by the sun, after a frost, than by the frost itself. If for this purpose only, protection would be beneficial. The above observations may, perhaps, engage attention, as to the utility of protecting wall-trees, in a greater degree than a mere recommendation to do it.

Peach, Nectarine, and Apricot.—In some favourable and early situations, it may be necessary to commence disbudding at the latter end of the month, but generally very little is required before the following month.

Raspberry.—Take an early opportunity to break down and level the rough clods about the stools, before the suckers commence growing. The whole of the shoots of the *double-bearing* should now be cut down to within a few inches of the ground. This is a most valuable variety for autumn use.

Strawberry.—Loosen the surface soil between the plants, so that they may receive the full benefit of the sun and warm showers. The common hoe is a very improper tool for this purpose. A piece of iron rod, three-eighths of an inch in diameter, made in the form, of a sickle, with a chisel end, the turn being about ten inches, and fixed to a long handle, will be found a most effective and useful implement for the purpose of loosening the soil.

Orchard.—Head down newly planted young fruit-trees: stake securely, and mulch with litter all those recently planted. In some soils and situations, if the weather should prove very dry, it may be necessary to water them. Tie espalier trees. Strew a little fresh slacked lime round about the stems of Gooseberry trees, and rake it in. This will be a means of preserving the trees from the ravages of the caterpillar.

The destruction of *Wasps* should be most particularly persevered in, at this season, by the fruit-grower. Every wasp now destroyed would, a few months hence, be the parent of thousands. H. C. O.

KITCHEN GARDEN, AND VEGETABLE FORCING.

The main crop of Broccoli should be sown the beginning of the month, in a situation free from the shade of trees, but sheltered from sweeping winds. The seed should be sown broadcast, on four-foot beds, in light, rich soil. Nets, fixed to frames, should be placed over the beds, to protect from birds. As soon as the plants are up, and the seed-leaves fully expanded, the nets should be removed, and a good dressing of slaked lime strewn over the whole of the beds. This will be an effectual preventive against the fly. Stir the surface of the soil with a pointed stick, and thin the plants with the same. When the plants are large enough to handle, transplant as many as will be required, into beds of the same description, three or four inches apart, in rows, so that the Dutch hoe may be frequently worked amongst them, until they require a second removal. The following are first-rate kinds:—Snow's Superb Winter White, Elsdon's ditto, Chapple's Cream, Hammond's Cape, Green, and Purple ditto, Wilcove, Walcheren, and Miller's Dwarf. Sow and treat in the same manner Brussels' Sprouts, Savoys, Borecole, Successional Cabbages, and Cauliflowers. Transplant those that have been previously sown. Draw the earth about the stems of early crops, and never allow the surface of the soil to become set. Remove the hand-lights from off Cauliflower plants, about the middle of the month, if the weather be favourable. Plant general crops of Potatoes, if possible, on light loamy soil, moderately enriched with good stable manure. For all late kinds the rows should be two feet and a-half apart, and the sets nine inches in the rows. Dutch hoe and earth up the early kinds, as soon as they require it. Full crops of Carrots should be got in as soon as possible. Secure a light sandy piece of ground, that has been trenched down to the subsoil during winter, and fork in, just previous to sowing, a slight dressing of thoroughly decomposed dung. If the soil is in good condition, leaf-mould would answer the purpose better; for if there be much manure near the surface, it will cause the crop to become forked. Sow in drills, a foot apart, and thin with the draw hoe, leaving patches from nine inches to a foot apart, as soon as the rows are perceptible. These patches may be singled when the plants get established. The seed of Carrots should be put in rather thickly, as they are subject to the attacks of insects, and covered securely; for if at all exposed, the winds will carry it away, the seed being of a flimsy description. Watch for slugs, and in case of attack apply the under-mentioned remedy. Sow and treat in the same way Blood Red Beet, White Beet, Salsafy, Scorzonera, and Skirret; also, full crops of Parsnip, if not done last month. Sow two or three times in the month, Stone, Dwarf Red Stone, which is an excellent variety, Snowball, or Nonsuch Turnips. Should vacancies have occurred in the drills of the Onion crops, transplanting must be resorted to. Hoe and keep them thoroughly clear from weeds. They may be thinned with a three-inch draw hoe, with economy of labour, and benefit to the plants. Transplant autumn crops into drills nine inches apart, and five or six inches in the rows, on deep, rich soil.

French Beans.—Sow on a sheltered border Mohawk of six weeks, the first of the month, and Newington Wonder, or Wilmot's Forcing, in an open quarter, towards the latter end. Plant Scarlet Runners in rows, five feet apart, and three inches in the rows. Put in successional crops of New Royal Cluster, Long-pod, Broad, or Windsor Beans. Make a liberal sowing of Peas twice in the month of Scimetar, Thurston's Reliance, Knight's Dwarf Green Marrow, Hair's Dwarf Green Mammoth, Knight's Marrow, and Flack's Victory. Earth up and stake early crops. Instead of sowing the present and later crops in the common way, prepare trenches as for Celery, fill them to within five or six inches of the surface of the ground with good, rich, manure, slightly cover it with soil, and sow the Peas. The benefit to be derived from this plan will be such a vigorous growth as will completely set at defiance the attacks of mildew.

Blanch Seakale by covering the crowns with Seakale pots or inverted flower-pots. Where these are not at hand, place over the beds a sufficient thickness of old tan, sawdust, or cinder ashes. Make new plantations, if required, upon well prepared ground. Whether the soil be light or strong, it is indispensable, for the production of good crowns, that it be rich, and three or four feet in depth. Light soil is most suitable to this vegetable; but if a tenacious one becomes a matter of necessity, it may be much improved by intermixing, during the trenching of it, a quantity of clear, sharp sand, and forming beds six feet wide, with 8-inch alleys cleared out to the subsoil; this will have the double

advantage of increasing the depth of the soil, and being a means of drainage. Sow seed in nursery beds having a similar preparation. Sow an abundance of curled parsley. Ayres' Giant is a very superior kind. Sow Fennel, Borage, Marjoram, and other kinds of herbs. Make new plantations, if wanted, of Thyme, Tansy, Tarragon, Rue, Sage, and all sorts of Mints. Sow seeds for late crops of Celery, and transplant those sown in February and March, four inches apart, in light, rich soil, and protect with frames. Stir the soil after watering. If the celery fly attack the plants, serve it a notice to quit, by taking up the plants and dipping them in tobacco water, and replanting them. Sow and plant out successional crops of lettuces twice a-month, and stir the surface of the soil amongst them as frequently. Keep up a supply of Radishes, Mustard, and Cress. The severe weather of last month will have considerably retarded the progress of most early crops; therefore extra attention will be required in the application of the means of promoting their growth. Let weeds be no sooner seen than destroyed; and keep the surface of the soil continually porous among all crops, as this admits the free ingress of both air and rain.

There is no one thing in kitchen gardening that requires more unceasing attention than the destruction of insect pests; for, notwithstanding the subjection under which most gardeners strive to keep them, but a month or two's neglect at this season will suffice for them to emerge, in myriads, into active existence, destroying in rapid succession Peas, Beans, Lettuces, Cauliflowers, young Broccolis, and the like crops, which, once devoured, cannot at least be replenished this season, so as to come in at their respective seasons of maturity. Amongst the most destructive of all these may be mentioned slugs; and the following recipe, if properly followed up, will keep them under due subjection. Inspect all such crops, as above mentioned, early in the morning, and after every shower; if any are perceived, strew lime over the whole surface of the ground on a sunny morning, and continue the dose until their ravages are stayed.

WILD FLOWERS OF APRIL.

The wild flowers to be met with this month may be divided into two classes—those properly belonging to April and the beginning of May, as the especial flowering months, and those which have a longer period of blossoming lasting throughout several succeeding months, and now beginning to show their earliest flowers.

Under the first head come several of the Monocotyledonous division, generally, as a whole, flowering earlier than the Dicotyledons.

Orchis mascula.
Ophrys aranifera.
Fritillaria Meleagris.
Tulipa sylvestris.
Hyacinthus non-scriptus.
Ornithogalum umbellatum.
Salix: many species.
Betula alba.
Buxus sempervirens.
Mercurialis perennis.
Empetrum nigrum.
Primula elatior.
Primula veris.
Cyclamen europæum.
Veronica verna.
Veronica triphyllos.
Scrophularia vernalis.
Potentilla verna.
Holosteum umbellatum.
Denturia bulbifera.
Cardamine pratensis.
Cardamine amara.
Draba aizoides.
Anemone Pulsatilla.
Anemone apennina.

Of the second class, a great number of plants will be found in flower towards the end of the month, especially if the season be forward; among them may be noticed particularly those of the natural order Cruciferæ, Saxifrages, the species of *Ribes*, many of the Alsinaceous Caryophylleæ, as *Cerastium*, *Stellaria*, &c., Rosaceæ, especially the species of *Pyrus*, *Prunus*, &c. Also, several Geraniaceous, Leguminous, Labiate, and Ranunculaceous plants.

The field botanist will not, indeed, collect many plants to advantage in this month, since, for preservation in herbaria, the specimens are usually best gathered late in the season, as the later flowering examples are then met with in company with the fruit of the earlier individuals. But, putting out of consideration the delightful sensations derived from the contemplation of the renewal of active life, which a stroll in the country at this season affords, the botanist will not find excursions altogether useless, even if he do not gather many flowers. Many points yet require to be cleared up, even with regard to common plants, as to characters of the vegetative portions of them when out of flower, the aspect and foliation of young specimens, the mode of propagation of the perennial herbaceous kinds, &c., which can only be inquired into at this season. Of the Cryptogamie plants also, especially of Mosses, this month affords an abundant harvest. A. H.

ANIMAL KINGDOM.

Ornithology.—April, with its sunshine and its showers, brings to our shores a large portion of those little wanderers who come to rear their young amongst our woods and fields; for although one or two may have been seen or heard during the last few days of March, still there is no general arrival until April has set in.

The first heard is generally the Chiff Chaff (*Sylvia hippolais*), known by its peculiar notes, from which it takes its name—it frequents woods and plantations; then the Wheat Ear (*Saxicola œnanthe*), upon ploughed lands and commons; the Wryneck (*Yunx torquilla*), or as it is often called, the Snake Bird, from the peculiar flexibility of its head and neck, amongst old fruit trees in gardens and orchards. The call note of this bird is of so strange a character that it cannot fail to attract the attention of the most careless observer; then follow in quick succession, the Willow Warbler (*Sylvia trochilus*), Black Cap (*Curruca atricapilla*), Garden Warbler (*Curruca hortensis*), and White Throat (*Curruca cinerea*), they frequent the outskirts of woods, small plantations, and gardens. The White Throat (*Curruca cinerea*), may also be found pretty numerous on commons that are thickly overgrown with furze, amongst which it may be heard repeating its short guttural call notes. Rising at intervals for about a dozen yards in the air, it performs such grotesque and strange antics, as would put the most renowned polka dancer to the blush; during this performance, it utters the few short notes that compose its song—it is the most numerous of our summer birds.

Then comes that queen of songsters the Nightingale (*Philomela luscinia*); she it is who makes our woods echo with her delicious melody. Who can name a greater treat, than to take one's seat on a stile or gate, on a calm moonlight night, upon the outskirts of some copse, or wood, which is the dwelling place of this bird of Paradise—for such should have been its name—and there listen to such music poured from its little throat, as cannot fail to charm the most uncultivated ear. The Nightingale generally prefers those trees which are of a springy nature, taking up its abode near to some gurgling brook.

The Swallow (*Hirundo rustica*), Martin (*Hirundo urbica*), Sand Martin (*Hirundo riparia*), and Redstart (*Phœnicura ruticilla*), also make their appearance this month; the latter may be seen in orchards and parks, preferring open places to the thick cover of woods. The Cuckoo (*Cuculus canorus*) also comes to visit his old haunts at this time. Where is there a person who does not feel a sort of inward pleasure when he hears the Cuckoo's voice for the first time in the season—green fields, and warm and shady lanes, scented with the White Thorn and the Blue Bell, such spots where lovers delight to roam, are brought to the mind's eye,

by the Cuckoo's magic note; he tells us, as plain as bird can tell, that there is a good time coming; he loves to haunt those woods and plantations that border upon heaths and commons.

Amongst the reeds and sedges that grow by the sides of rivers, ditches, and other aquatic places, a very interesting, and, to my idea, a happy little bird may be heard. To see him is another thing, for that is a difficulty, although he will allow you to approach within a few feet of his retreat—to discover him amongst the thick cover by which he is surrounded is almost an impossibility. You may hear his funny little song of "Chid, chid, chiddy—chid, chid, chiddy!" proceeding from the thick cover, and you may imagine that by striking near the spot with your stick, or flinging in a stone, you can drive him from his retreat—vain hope; a pause in his song succeeds the blow—expectation is at the highest, when the note of the Swallow falls upon the ear, it appears to proceed from the centre of the bush—strange place for such a bird—that is followed in quick succession by the notes of the Skylark, Sparrow, Reed Bunting (*Emberiza schœniclus*), and many others, although no such birds are to be seen near the spot. This, kind reader, may appear to you like magic, and so it is; it is the magic of your Chid, chid, chiddy friend, the Sedge Warbler (*Salicaria phragmitis*), or Mocking Bird, as merry a little fellow as ever was decked in feathers. H. W.

Ichthyology.—The noblest aspiration of man is his thirst after knowledge, and his chief characteristic the power which he possesses of communicating this knowledge to others by records, which not only enlighten his cotemporaries, but, surviving the time in which they were written, render the attainments of each age subservient to those of succeeding generations; so that not only individuals, but the race is susceptible of progressive improvement. At no previous period has this aspiration after knowledge been so general and intense, or the records calculated to diffuse it, so numerous—so almost overwhelming as at present. And, strange to say, that while the press teems with elementary works, upon almost all departments of natural history, it may be said that the language possesses no work devoted to the consideration of fishes as a race of beings. I wish opportunity was afforded to me of entering fully into the subject of Ichthyology; and, avoiding, as much as possible, the dry abstraction of the science, to lay before my readers an account of the structure and functions of that great class of beings. The study of Ichthyology is vast in its extent, and engrossing in the interest it excites, as involving in its pursuit considerations of the greatest importance and utility, not only as far as regards the place which fishes hold in the mighty scale of creation, but also in respect to their economical and commercial relations. Whether I may at another time carry into effect my wishes depends upon a variety of circumstances; meanwhile I propose to offer to my present readers some desultory sketches concerning the structure and functions of fish, in the hope of attracting the attention of the student to this most interesting department of natural history, in which he cannot fail to find unanswerable illustrations of the wisdom, and goodness, and power of the Creator.

I must, however, at this time, merely endeavour to impress upon my reader, that, independently of all the other attractions of the pursuit of Ichthyology, in studying the economy of Fishes, he is studying, indirectly, that of animated nature in general. Nor, perhaps, is any individual department of Zoology so much adapted as this to give him an insight into the science in general. Ranking, as Fishes do, as the lowest of the vertebrate tribes, they are, of course, but one remove from the avertebrate; and their relation to both is, consequently, so intimate that they may be said to form a kind of stepping-stone between the two great families into which the whole animal kingdom is divided. From this point, equi-distant almost from the lowest and from the highest in the scale, our prospect is, perhaps, less limited than from any other. In studying the avertebrate animals, in general, so vast is the expanse between them and the highest order of vertebrate, that the imagination often pants in vain to trace any analogy; and the same thing occurs if we begin with the latter, and endeavour to establish points of connection between them and the insignificant beings at the other extremity of the chain. But, beginning with the study of Fishes, we stand, as it were, upon a point in the centre of the immense prospect, and are enabled, without any great effort, to grasp the whole. Nothing is too low, nothing is too high, for our immediate application. We recognise everywhere the relations in which the tribe stands, as well to the most abject, as to the most exalted of created beings; and the soul is raised at once to the praise and adoration of that Being whose might, wisdom, and goodness are everywhere conspicuous, and who has made man capable of perceiving, in some degree, the infinite perfection of His manifold works.

But I must not more digress. This is April, and it is now that river fish issue forth from their wintry retreats, and glide softly and quickly—now rising, now sinking, and now progressing swiftly onwards through the liquid element. The angler's season commences. He puts his rods, and lines, and hooks, in order; and takes care that his tackle is all right for the ensuing campaign. The weather, however, is still too cold for these "fairy creatures" to disport freely and gladly in the waters. The perch—the bright-eyed perch, with fins of Tyrian dye—scarcely ventures even towards the surface; for the heaven is ever and anon o'ercast, as if "gleams of sunshine from a wintry sky" still illumined, rather than warmed, the face of creation. Therefore does the "yellow carp, in scales bedropped with gold," not expose himself to the insidious bait of the angler's temptation; and the "swift trout, diversified with crimsoned stains," will as yet not rise to, or dart at, the most nicely adjusted, but still delusive fly. The Naiads of our streams, during the precarious month of April, therefore, afford little sport. The winter has scarcely yet elapsed; although their bright scales already begin to brighten, and become more deeply coloured and variegated as the sun rises in the ascendant. Nevertheless, besides the Carp, the Perch, and the Trout, we have in this month Roach and Dace, and the tyrannous Pike, whose marvellous voracity renders him the terror of the finny tribe. The Bream, Flounder, and Pilchard, also, are now in what gourmands consider prime condition; and Herrings and Sprats, also, come forth to be offered up at the shrine of culinary art. It was given to man that he should have dominion over the birds of the air, the beasts of the fields, and the fish of the sea; and the natural instincts and habits of each class and order of created beings, suggest, every successive month, reflections which lead us in admiration onwards from Nature up to Nature's God.

J. S. B.

Entomology.—The increasing temperature of the season exercises a threefold influence on the development of the insects: firstly, upon such as are now hatched from eggs deposited in the preceding autumn by the parent insects, which died immediately after they had completed that operation; secondly, upon such species as were hatched from the eggs during the preceding autumn, but which have remained in the larva or caterpillar state until the present time, passing the winter months in a state of lethargy; and thirdly, those which, having passed through the larva state in the preceding summer or autumn, have remained throughout the

winter in the chrysalis or pupa state, and are now developed as perfect insects, each ready to continue its kind.

It is on this account, rather than from the amount of the positive mischief which these newly-developed perfect insects commit, that the destruction of such of them as are injurious to the cultivator, is to be recommended. It is, however, far different with those species which now awaken to life with all the avidity of appetite, sharpened by their long fast through the winter, or by the natural craving for large supplies of food possessed by all newly-born animals. Hence the injuries which are committed on vegetation, and especially upon fruit- trees, are now of the most serious kind; for, feeding on the blossom buds, they devour them in greater numbers than at a later period, from their not being yet fully expanded, and consequently affording a smaller amount of food. Such are the larvæ of various small Moths, which feed on the buds of our wall-fruit-trees, fastening the gradually expanding leaves into a mass by means of their strong webs; eating out the heart of the mass, and thus destroying the hopes of the cultivator for the season. Hand-picking, therefore, should now be carefully followed, and all old shreds and dead leaves removed, as these form harbours for the destructive insects.

The Earwig, now, will also often be found in turning up the mould of the garden; but all the individuals should be destroyed, as they are females, and in a short time each will be found brooding over its mass of eggs, and tending its young with as much assiduity as a hen brooding over her chickens,—a remarkable peculiarity, entirely at variance with the ordinary proceedings of insects, which die soon after laying their eggs, instinct teaching them to deposit them in situations where the young will find a supply of proper food. Every individual of the Common Wasp now seen should also be destroyed, as they also are all females, and each will otherwise become the foundress of a new nest. Various kinds of Moths will also now be found, by carefully looking over the pales of gardens and fields, gates, &c. Many kinds of Wild Bees, and other insects, are now to be seen, collecting the pollen from the sallow, now in full blossom. At this season, also, the collector will obtain much success by digging at the roots of trees for the chrysalides of Moths; great care must, however, be taken in removing them from their retreats, and in placing them in artificial cages and in earth, kept as nearly at the same degree of moisture as that from which they were taken. Now that vast numbers of species of all the orders are daily arriving at the perfect state, we can, only furnish a list of the most conspicuous or injurious species.

Coleoptera. *Carabus violaceus*.—At roots of trees, and under stones.

Carabus nemoralis. In gardens.

Carabus monilis. On heaths, and in sandy places.

Brachinus crepitans (the Bombardier-beetle). In sand-pits and understones.

Dromius quadrimaculatus, and several other species of the genus. Under bark of trees.

Steropus madidus, *Omaseus nigrita*, *Abax striola*, and other species of large black *Harpalidæ*. — Under stones.

Pœcilus cupreus, *Amara vulgaris*, and other metallic-coloured *Harpalidæ* (Ground-beetle). — Running in pathways in fields in the sun.

Lopha pœcila, *Tachypus celer*, *Bembidium flavipes*, and many other small species of *Bembidiidæ*. — At roots of grass, and on moist banks.

Hydroporus 5-pustulatus, *Colymbetes paludosus*. — In ponds and ditches.

Dytiscus marginalis, and a great number of species of Water-beetles (*Dyticidæ*) of all sizes. — In ponds and ditches.

Gyrinus natator (the Whirl-wig).—On the surface of water.

Cercyon quisquilium, *Sphæridium scarabæoides*, *Aphodius fossor*, *Hister unicolor*, and a great number of species of these genera. — In dung.

Necrophorus Vespillo, and other species of *Silphidæ*.—In dead animals and carrion.

Staphylinus olens, and a vast number of species of *Staphylinidæ*.—In dung, moss, rotten fungi, &c.

Meloe proscarabæus, *Meloe violaceus*. — On heaths and commons.

Ptinus fur.—In houses.

Elater marinus, *Elater segetis*, and other species of Click-beetles. — In paths, and banks of corn-fields, &c.

Chrysomela polita, *Chrysomela sanguinolenta*, *Timarcha tenebricosa*, and other species of *Chrysomelidæ* (Plant-beetles). — On grass and nettles at bottom of hedge-rows, &c.

Hymenoptera. *Vespa vulgaris*. The Common Wasp. Female.—In lanes and gardens.

Andrena nigro ænea, *Andrena fulva*, and a number of species of this genus of Bees. — Blossoms of willows, gooseberry, &c.

Bombus campestris.—In fields.

Anthophora retusa.—In gardens.

Lepidoptera. *Vanessa Atalanta* (the Red Admiral Butterfly).—In lanes and woods.

Vanessa Io (the Peacock Butterfly).—Ditto.

Lycæna Phlæas (the small Copper Butterfly).—Grassy commons.

Macroglossa stellatarum (the Humming-Bird Hawk-Moth).—In gardens.

Endromus versicolor (the Glory of Kent).—On trunks of trees in woods.

Scoliopteryx libatrix (the Herald Moth).- On Poplar trunks and palings.

Orthosia gothica (the Hebrew Character).—Hedges.

Semiophora instabilis (the Drab Moth).—Fallows and osier beds.

Orthosia cruda (the Small Quaker).—Willows.

Hadena lithorhiza (the Early Grey).—On palings.

Miselia Aprilina (the Marvel du Jour).—Skirts of woods.

Cucullia scrophulariæ (the Water Betony Moth).—Palings and gardens.

Brepha notha and *Parthenias*.—Blossoms of willows.

Biston hirtarius (the Brindled Beauty).—On trunks of oaks.

Geometra illunaria (the Early Thorn).—Shady groves.

Odontopera bidentaria (the Scalloped Hazel).—Skirts of woods.

Larentia cervinaria (the Searce Tissue).—Gardens and pales.

Rumia cratægata (the Brimstone Moth).—Hedges and woods.

Lampropteryx suffumata (the Water-Carpet Moth).—Open places in woods.

Lampropteryx badiata (the Shoulder-Stripe). | Skirts of woods.

Carpocapsa Ulicctana (the Light-striped Edge).—Furze on commons.

Diptera. *Beris clavipes*.—On palings near meadows.

Bombylius major and *medius*.—In open places in woods, hovering in the sunshine. J. O. W.

S. Hibberden del. et lith.

Printed by C.F. Hodgson

Gastrolobium Hügelii.

GASTROLOBIUM HUGELII.

Nat. Order, Leguminosæ & Papilionaceæ.

Generic Character.—Gastrolobium, *R. Br.*—*Calyx* campanulate, five-toothed at the apex, two-lipped. *Corolla* papilionaceous, petals with short claws; *standard* broadly orbiculate, emarginate, rather exceeding the oblong *wings*. *Keel* oblong, obtuse, a little shorter than the wings. *Stamens* ten, free, filaments glabrous. *Ovary* stipitate with two ovules; *style* filiform, ascending; *stigma* thin, sub-capitate. *Legume* stipitate, ovoid sub-globose, inflated; *seeds* strophiolate.—(*Endlicher Gen. Plant.*)

Gastrolobium Hugelii.—Hugel's Gastrolobium. — Stem rigid, repeatedly three-forked, hairy; leaves in whorls of three, cordate-orbiculate, obtuse, with a longish awn. Flowers axillary, peduncles longer than the calyx; calyx teeth acute, ciliated; corolla deep yellow.

DESCRIPTION.—A dwarf shrub, with rigid stems repeatedly divided into three, by opposite branching; hairy. The leaves are almost orbiculate, with a cordate base, sessile, and provided with a long awn at the obtuse apex; they are arranged in whorls of three, and from their axils arise the single pedicels, so that the flowers are also in whorls of three. The pedicels, somewhat longer than the calyx, are without bracts. The five-toothed, two-lipped calyx has acute ciliated teeth. The corolla is of a deep yellow colour, with a large, transversely expanded, reflexed, and deeply bifid standard; the wings are incurved, overarching the keel.

History.—The plant from which our figure is taken was raised from seeds sent by Mr. Drummond from Swan River. It is in the possession of Messrs. Knight and Perry, Exotic Nursery, Chelsea. The drawing was made in August of last year; but like its congeners it may be expected to prove an early summer-blooming plant.—A. H.

Culture.—This very pretty addition to the Gastrolobiums appears likely to flower more profusely than most species of the genus. To grow it to perfection take small healthy plants any time in March, and pot them, if they are well rooted, into pots two sizes larger than those they were previously growing in, using a compost of rich turfy peat, with about one fourth of turfy loam, liberally intermixed with sand, potsherds, and charcoal broken small. After the plants are potted, place them in a close frame or intermediate house; water cautiously for the first few weeks, but when the plants begin to grow, they may be liberally supplied. Syringe them daily, and keep a moist growing atmosphere. During their growth, take care to train them carefully, and stop the stronger growing shoots, until you get the plants into compact form. If the plants grow properly, they will require a second shift about the end of June, and probably a third in August; this, however, will of course depend upon the growth, and the direction indicates what they ought to do under proper management. When the pots are filled with roots, a little clear weak liquid manure water may be used with advantage once or twice a-week.

Gastrolobiums are very subject to the attacks of red spider; therefore, keep a sharp eye upon them, and if you cannot clean them by powerful syringing with clean water, dust them over with sulphur for a day or two, and then wash it off again. By this treatment specimens of considerable size will be produced the first season, which should produce a profusion of flowers in the second year. After blooming, remove the seed pods immediately, and if necessary shorten the branches a little to promote compact growth. Keep the plants rather cool for a short time after blooming; but when they break, and get into free growth, pot them if they require it, and grow them in the open air throughout the summer and autumn. Although the temperature of the intermediate house has been recommended for young plants, the Gastrolobiums are of course greenhouse plants. They are propagated by cuttings of the half ripened wood, taken off in August, and inserted in sand under a bell-glass. Do not place the cuttings in heat, but let the pot stand in a cool frame until the ends of the cuttings are cicatrized, when by placing them in a gentle heat they will emit roots immediately, and may be potted off in spring.—A.

The name Gastrolobium, comes from *gaster*, the belly, and *lobos*, a pod: and is applied in consequence of the peculiar form of the seed-pods, which are more or less swollen or inflated.

Sacred Botany.—The Terebinth—Nuts.

THOUGH unnamed in the authorized version of the Scriptures, except in the Apocryphal book of Ecclesiasticus, the Terebinth tree is, according to the concurrent testimony of the ablest biblical critics, frequently alluded to in the original text. In many of the passages, in which our translation reads "oak," it is held that the Terebinth is intended—an error of translation having originated, probably, in the near resemblance of the Hebrew names, which are supposed to indicate these two trees, that of the Oak being *Allon*, and that of the Terebinth *Alah*, or *Ailah*. The Hebrew *Alah* is, in many instances, translated by "plain," and, in these passages, the proper rendering seems also to be Terebinth. In one text, *Alah* is translated "Tiel tree," (Isaiah vi. 13); a name belonging to the Linden or Lime (*Tilia europæa*); but there seems no good reason for preferring this reading, in the present instance, and the Terebinth again should rather be understood. In one other passage in our version, it is rendered Elm, (Hosea iv. 13). The word also occurs in the masculine singular, in the name *El*-Paran, (Gen. xiv. 6), for which our marginal readings substitute, Plain of Paran, and which we may understand to mean the Terebinth, or Turpentine tree of Paran. If the two isolated passages above mentioned are thus allowed to have reference to the Terebinth tree, then neither the Lime tree, nor the Elm are mentioned in the Bible.

PISTACIA TEREBINTHUS.

Taking, therefore, the current interpretation, and understanding the Terebinth to be intended by *Alah*, we shall briefly glance at the allusions of the texts in which it occurs. These passages convey strongly the impression, that the shelter and shade of the Terebinths constituted them the homes, or resting-places of the nomade wanderers of the patriarchal age; and, in after times, when their descendants became a settled community, a degree of sanctity became attached to the aged shelterers of their forefathers: and, perhaps, also, to the trees generally, on that account, irrespective of their age or history. That the tree was well adapted for sheltering, the temporary, or periodical homestead of these "dwellers in tents," is evident, from Ecclus. xxiv. 16, where the writer, in a figure of speech, refers to its wide-spread branches. "As the turpentine tree I stretched forth my branches, and my branches are the branches of honour and grace." It was, moreover, the thick boughs of a great Oak, (Terebinth), which caught hold of the flowing tresses of the rebellious Absalom, when fleeing on his mule before his father's victorious army, (2 Sam. xviii. 9, 10, 14). In accordance with the view we have taken, we find, that when the patriarch Abram, left the land of his fathers, to sojourn in that land which God should show him, his first recorded halting-place was the Plain (Terebinth tree) of Moreh, in the place of Sichem, (Gen. xii. 6); and afterwards he came and dwelt in the Plain (Terebinth grove) of Mamre, which is in Hebron, and built there an altar unto the Lord, (Gen. xiii. 18). It was here, we read, that "the Lord appeared unto Abraham, in the Plain (Terebinth grove) of Moreh; and he sat in the tent door in the heat of the day" (Gen. xviii. 1). In this case, the patriarch. as we learn from the context, desired the heavenly messengers to rest themselves under THE TREE. A venerable Terebinth, which, about the commencement of the Christian era, existed at Mamre, near Hebron, was, by a tradition, old in the time of Josephus, alleged to be that under which Abraham pitched his tent, as referred to in the texts above quoted. According to another tradition, this venerable tree sprang from the staff of one of the angels who appeared there to Abraham. There are recorded in the Bible, other instances of the pitching of tents, and of sitting, or resting, under Terebinth trees, (Judges iv. 11; vi. 11-19; 1 Kings xiii. 14).

Besides overspreading and sheltering the patriarchal sanctuaries, and halting-places, the Terebinths also cast their venerable shade around the burying-places of their dead. The men of Jabesh Gilead, when they had rescued the remains of Saul and Jonathan from their Philistine conquerors, "buried their bones under the Oak, (Terebinth), in Jabesh" (1 Chron. x. 12). Jacob also, we are informed, buried, or hid the strange Gods found among his company, under the Oak, (Terebinth), which was by Shechem, (Gen. xxxv. 4), where was probably an altar, or sanctuary, which marked the previous

halting-place of Abraham. In the after history of the Jewish nation, Ezekiel mentions a perversion of these primitive sanctuaries—"their slain men shall be among their idols, * * * under every thick Oak, (Terebinth), the place where they did offer sweet savour to all their idols" (Ezek. vi. 13).

The Terebinth tree belongs to the genus Pistacia, of which three or four species are distributed over various parts of the south of Europe, Northern Africa, and the Levant. The species considered as the Terebinth of the Bible, is the *Pistàcia Terebinthus* of botanists, the source of the Chian, or Cypress turpentine. It is a deciduous tree, with spreading branches, bearing alternate impari-pinnate leaves, having about seven ovate-lanceolate leaflets, somewhat rounded at the base, and acute at the tips. The flowers are inconspicuous, disposed in racemes, and succeeded by rounded, somewhat furrowed fruit, becoming reddish, and finally changing to black, or a very dark blue, when ripe; the kernel, "clammie, full of fat, and oilous in substance, and of a pleasant savour." The leaves and flowers emit a very resinous odour, which is more especially observable at sunset, when the dew is falling, after a very warm day.

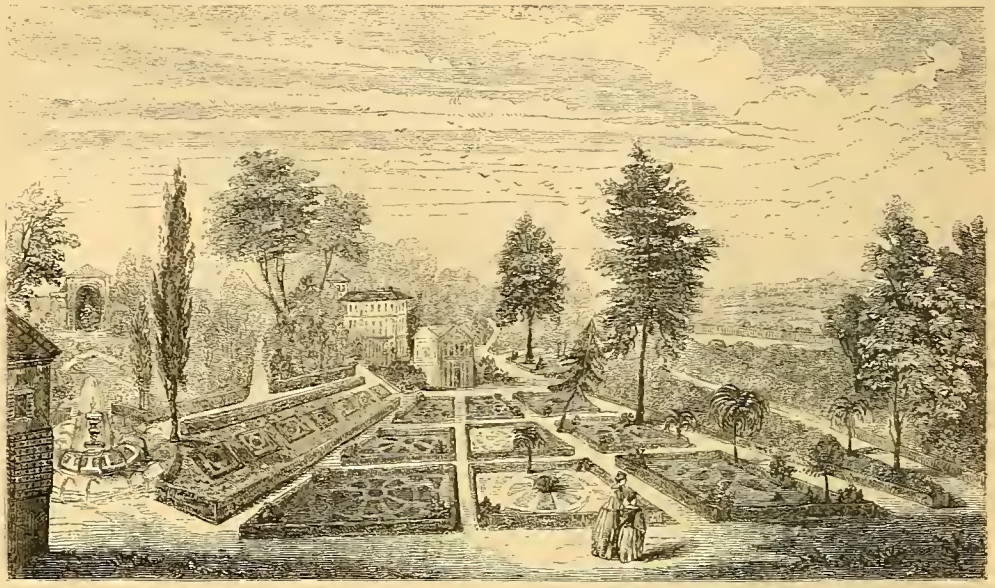
"The turpentine is procured from the *P. Terebinthus*, by making numerous slight incisions in the trunk, and principal branches, from the ground as high up the trunk as a man can reach, from the 15th to the 20th of July, according to the Greek Calendar. The Terebinth oozes out of the wounds made in the bark, and, in a few days, becomes hard and dry, by exposure to the air, as in the case of the resins produced by the Pine tribe, and with resins generally; the colour is a bluish or greenish white. It is collected every morning, from the wounds in the trees, with a spatula, and is purified from any extraneous matters that may have stuck to it, by liquefaction by solar heat, and by passing it through a sieve. The largest trees of fifty or sixty years growth, with trunks four or five feet in circumference, do not yield above ten or twelve ounces annually; hence the high price of the article, and its adulteration with Venice turpentine, which is produced from the Larch; or with common turpentine, which is drawn from the Scotch Pine. The Terebinth, which is pure, is called the Chian or Cypress turpentine, (from Chios, the ancient name of Scio); and, when unadulterated, it is known from the common turpentine, by being thicker, and possessing a far more agreeable odour; it is also destitute of bitterness and acridity."—(*Loud. Arb. Brit.*)

This tree is not very commonly met with in English gardens, probably in consequence of its not being thoroughly hardy. It will rarely succeed, except in the most sheltered situations in the open borders, and requires a warm and thoroughly drained soil. There is a large, old, but not very handsome, plant against the wall in the north-east corner of the garden of the Society of Apothecaries, at Chelsea, a branch of which has grown above the high wall, and formed a tree-like head. This plant does not appear to suffer from cold, and is in tolerable vigour.

Two species of the genus Pistacia (P. Lentiscus and atlantica) yield mastich; the fruit of another (P. vera) contains a kernel, which is oily and mild to the taste, and on account of which the plant is sometimes cultivated. This is not, however, the Pistachia nut imported from the West Indies, which is the produce of a totally different tree.

The last-named species of Pistacia (vera) has been taken to be the plant which yielded the "nuts" sent by Jacob, as a conciliatory present, to the "ruler throughout all the land of Egypt." "Take of the best fruits in the land in your vessels, and carry down the man a present—a little balm, and a little honey, spices, and myrrh, *nuts*, and almonds" (Gen. xliii. 11). Among the translations of the term *botnim*, which our version here renders "nuts," are the following:—Walnuts, Hazel-nuts, Pine-nuts, Peaches, Dates, the fruit of the Terebinth, and Almonds; but Dr Royle remarks, there is little doubt that *Pistachio nuts* is the true rendering; for "the Hebrew word *botnim*, reduced from its plural form, is very similar to the Arabic *batam*, applied specially to the Terebinth tree. * * It appears moreover, to be sometimes used generically; as in some Arabic works it is applied to a tree, of which the kernels of the seeds are described as being of a green colour. This is the distinguishing characteristic of the *Pistacia vera*, of which the fruit is well known to the Arabs by the name of *fistuk*, which seems to be derived from the Persian *pisteh*. This, no doubt, gave origin to the Greek πιστάκια, said by Dioscorides to be produced in Syria" (*Cyc. Bib. Lit.* i. 346). The nuts sent by Jacob were, no doubt, the produce of Syria, or easily procurable there, and less common in Egypt.

The Pistachio-nut tree, which extends from Syria to Affghanistan, is common in the northern or cooler parts of Syria, and is found in some remarkable positions in Palestine, as on Mount Tabor. The nuts are much eaten by the natives of countries where they are grown; the kernel is throughout of a green colour, abounds in oil, and has a sweetish, agreeable taste. They form articles of commerce from Affghanistan to India, where they are used in a variety of ways, and are much relished by Europeans. Considerable quantities are also annually exported from Syria to Europe.—M.



THE PAPAL GARDENS OF THE BELVEDERE.

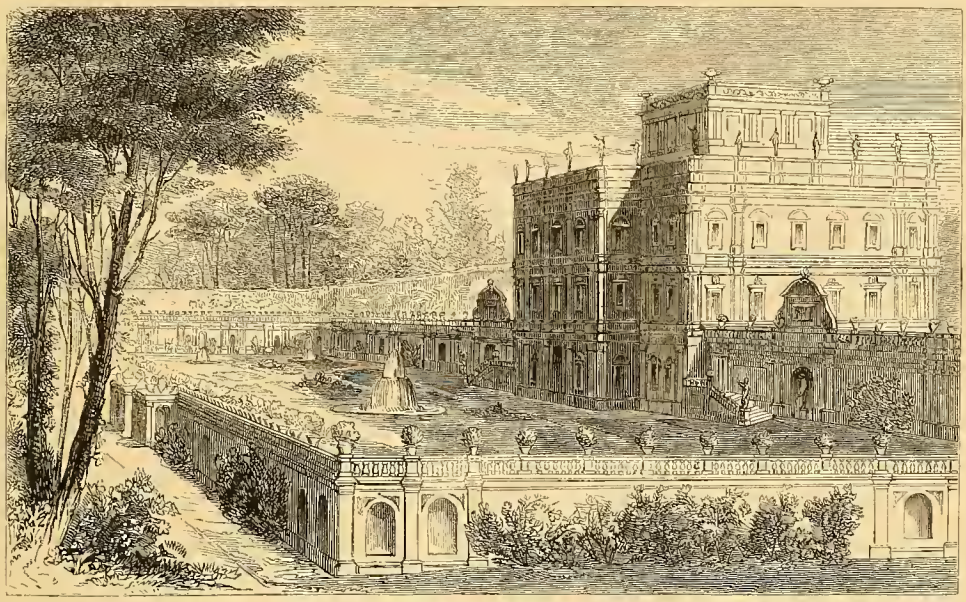
NOTES ON DECORATIVE GARDENING.—Architectural Terraces.

By H. NOEL HUMPHREYS, Esq.

I HAVE, in my last communication, shown how terraces may be produced at an exceedingly moderate expense, suitable to various styles of cottage and villa architecture, and it is on this moderate scale that suggestions for the formation of terraces will interest the greatest number; but this most important feature of decorative gardening would be but imperfectly explained did we finish the series without alluding to terraces in their more palatial form, and in their noblest proportions. It is not always necessary to terrace effects, on the largest scale, that architectural decorations should be introduced, for, by simple embankments, as suggested in our paper on cottage terraces, gardenesque features of a very noble character, and suited to residences of the highest class, may be obtained. The above engraving, from a portion of the Papal Gardens of the Belvedere at the back of the Palace of the Vatican at Rome, will serve to show what may be produced by such simple means; and though still susceptible of great improvement, the geometrical figures produced by deep box edgings, and the symmetrical effect given to the variety of elevation by the embankments, are evidences of a true feeling for the gardenesque in the designer. The effects to be produced near main terraces, by deep, massive box edgings, have been much neglected, and might be revived with great effect; but this feature must be cautiously used, and not carried too far, as, in that case, the attempts invariably sink into the meritricious—when, for instance, these cropped edgings are tortured into initial ciphers, or even entire epigrams, as in some of the later Italian villas; or to select a more modern instance, in the magnificent gardens of the Earl of Shrewsbury at Alton Towers—gardens reclaimed by art from land, which some years ago was no other than a barren waste—where, if my memory serves me correctly, a bust has been placed upon a marble column, in a conspicuous part of the ornamental gardens, at the base of which, the ingenious and persevering spectator may decipher, in the cropped box, the motto, "He made the desert smile,"* in honour of the late Earl of Shrewsbury, under whose directions the improvements were effected. Such elaborate conceits are apt to make the spectator smile; but they are not, as I have observed, without their precedent, for some of the finest of the Italian villas are disfigured by similar effusions, and to a much greater extent—of which several ridiculous and scarcely credible examples might be cited.

Of the more architectural terrace, with its full complement of statuary, vases, fountains, &c., the

* I am not certain whether the vegetable literature may not be confined to initial cyphers, and the motto itself engraved on the column; if so, the cyphers serve the purpose of illustration equally well.



THE VILLA PANFILI DORIA.

villa Panfili Doria may be cited as an example. Of this magnificent specimen, the engraving will convey a good general idea.

As displaying the true feeling of the palatial terraces of the school, these Italian villas are the safest, as they are the original models. I find, in my Italian journal, the following notes on these fine monuments of architectural and gardenesque composition.

The villas of the modern Romans merit the name of palaces, and form one of the most characteristic features of Italian scenery. Of those in the immediate vicinity of Rome, that of the Borghesi family, which is the confiscated domain of the unfortunate Cenci, is the most important; it is open to the public, and forms the Hyde Park of the Romans; but, neither Hyde Park, nor Kensington gardens, nor the Tuilleries, nor Versailles, can convey any idea of the peculiar charms of a Roman villa. There is a freshness of vegetation about the suburban *delizie* of Rome, that the neighbourhood of large towns always tarnishes, except in Italy. But there, close under the walls of Rome, the Appenine Anemone, of various tints, brightly-coloured Scillas, the deep-crimson Cyclamen, and many beautiful Orchids, put forth their fragrant blossoms in early spring, as in the woody dells of the secluded country. The "sky-cleaving Cypress" shoots aloft its pointed or forked peak to a height equal to the Poplar of the north, and noble groves of Ilices, whose vast trunks spread above with groined branchwork, into densely-matted foliage, form

"A pillared shade
With echoing walks beneath."

The peculiar character of the tufted heads of the Stone Pines, too, grouping in picturesque masses with terraces, statues, and fountains, tend to invest Roman villas with a charm peculiarly their own.

To return to the subject of our engraving, the villa Panfili Doria is next in importance to that of Borghesi among the villas near Rome; but its somewhat greater distance, and unhealthy situation, cause it to be much less frequented. The palace itself is, on its exterior, almost entirely encrusted with antique *alto-relievi*, some of which are of the highest merit, and most exquisite beauty. This is a luxury which cannot be imitated, except in Italy, where the soil still teems with the fragments of her ancient splendour, many of the finest of these *relievi* having been turned up in digging the foundation of the building. The whole of the composition of this palace and gardens—for the whole forms one harmonious design—is an excellent model for the careful examination of the modern student, but the reduced dimensions of our engraving, can convey but a very inadequate idea of the numerous and elaborate details.

I find the following brief notices of one or two other villas in my journal, with which I shall conclude

this article, which, though not strictly of a *practical* character, is yet, I think, calculated to convey my opinion of the styles to be adopted in the higher class of terraces, better than more mechanical definition.

The villa Albani, perhaps, realizes more than any other the dreams of the Italian villa, that haunt the imagination before having seen Italy. It is chaste, and severely classic in its style, yet, withal, richly magnificent, a rare and difficult combination. And to its intrinsic features, the charms of position are superadded, the range of views from its marble terraces commanding the finest portions of the picturesque campagna, with its rugged lines of half-crumbling aqueducts, and scattered groups of detached ruins.

The gardens of the Borghesian villa, Mondragone, at Frascati, combine, to an unusual extent, the richness of immediately surrounding features with the result of art. The noblest views over the Appenine range, and the campagna, the latter extending even to Rome, where the vast cupola of St. Peter's are seen describing a dim blue arch upon the horizon. The various and picturesque foreground offered by the rich marble terraces of Mondragone have not been overlooked by artists; many distant views of Rome, and of the ever-attractive campagna, having been painted from this spot.

THE PREPARATION OF AURICULAS FOR EXHIBITION.

By Mr. GEORGE GLENNY, F.H.S.

OF all the beauties which are nursed by florists, not one deserves more or gets less attention than the very beautiful Auricula. Simple as is its culture under proper management, yet the whole year's luxurious growth, and the finest health, will not secure us a bloom unless we pay the greatest attention at the proper time. There is no exotic that should be more strictly attended to in point of temperature. It is no use to say A. B. never does anything to warm or to cool his, and the open air is enough; because, although there are some seasons wherein nature is even tempered, and nothing inclement visits us, and, therefore, Auriculas might bloom well almost of themselves, there are others which vary twenty degrees within a very short period, and would destroy all the perfection, if not all the beauty, of an Auricula. The flower does not require heat, but it does not like cold; and when an ardent fancier sees his bloom crumpled, and attributes it to his soil or his management of the plants, he has only to blame the change of temperature that he has allowed to reach them after the flower stem came up. The Auricula should not suffer much change of temperature after the bloom rises; it should certainly have no frost, and only morning and evening sun. Heat is as bad as cold to the Auricula, but both are bad, and the effect is indisputably shown in the crumpled blooms—for the plant in itself is hardy enough. It has been recorded of the old and enthusiastic exhibitors of the Auricula, that during the blooming time, when they are removed to a snug corner under hand-glasses, they would take the blankets from their beds when they anticipated a frost, and cover up their favourite plants, a circumstance likely enough to be true, for we have known them to do things not a whit less extravagant.

We shall only trace the plants from the time the bloom pips show. And first, instead of the frames being opened almost mechanically in the morning and closed at night, the weather must decide the matter. If the thermometer indicates less than thirty-five degrees, they must only be tilted a little on the side or end opposite to the wind, but if up to forty and mild, let the glasses come quite off. If there be a beating rain keep everything close, but if a genial warm shower let the plants have it all. If the sun come out very bright and warm, shade the plants through the heat of the mid-day. Keep them always from extremes; and when they come up tall and begin to open their pips, remove them to a sheltered place, on a grass plot if you have it; place the pots under hand-glasses, which should rest on the bottoms of four flower-pots that will let the edge of the glass an inch below the edge of the pots in which the plants are growing; they, however, would be just as well on a table. All round about the place must be well watered to keep the dust from spoiling the flowers. Reduce the number of pips to seven, eight, or nine, which are enough to show off any flower in the world; and with a bit of soft moss placed between every two pips, keep them sufficiently apart to prevent them touching as they open; this must be carried right through the truss so as to give every pip room to open without interfering with its neighbours, for when they are once cramped and crumpled, they never come right again by all the art we can use. When the pips open free all round, they will completely fill up the truss, and they will open both round and flat. While they are under the glasses they have to be examined every day, more than once or twice, to see that they are going on right, and that none of the moss slips out of its place, because the pip which it kept in its place would give way and open

against some other. The weather must be the guide here too, as to opening the hand lights. If the glass be under forty degrees, cover with transparent cloth to the ground on the windward side. See that they have plenty of water—not touching the flowers—for in the blooming season they absorb a good deal.

The proper way to place the flowers is one in the centre and six round it, all just touching at the edges, but not lapping over at all. If there are more than seven pips, and all are good, put one or two at the top of the seven, or let some of them go to the top and some to the bottom, or one on each side; but the seven being perfect, should not be disturbed from their position by the over number. Sometimes it is better to cut away the worst till there are but seven remaining. All the time the plants are in their snug corner they must not have an instant's sun; on cloudy days all the coverings may be off, but if the sun should shine they must be put on again as quickly as possible, because a little sun would spoil the splendid colours and forms, on which alone the success of an exhibitor depends.

When Auriculas are removed for exhibition, none of the moss should be taken away, but a stick should be put in, and the stem made fast to it by putting, first, some moss round the stem, and then fastening a tie round the moss and the stick at the same time; they cannot then move from their places, and will travel any distance. When they arrive at the show, you first remove the stick by untying the fastening of the stem, and pulling out the prop; then with a pair of neat tweezers pull out the moss from between the pips, and adjust them in their places, so that the edges of the flowers only touch each other without lapping over in the least. In showing a pair of flowers, always get them well contrasted, because it is a most effective point. Again, always have them the same height and size as nearly as possible, for that is another good point; and, in class showing, where it is plant against plant, see that you do not show any in a doubtful place. Some flowers are classed among green-edged, some grey-edged, and some white-edged; now some flowers naturally grey-edged, and so classed, will occasionally become perfectly green; and if the judges see a green-edged flower put up for a grey-edged, or *vice versa*, so that the flower is not what it is put up for, they will throw it out, or place it low down. Oliver's Lovely Anne is a flower of this sort; it is a grey-edged flower sometimes, and a green-edged at other times; many put this up in the grey-edged class, come what it will, because in the catalogue it is called grey-edged. You should always show a flower for what it really is, and not what it is classed or called.

It is a common thing now to show Auriculas in sets of four plants, one green, one grey, one white, and one self. It is necessary that these should be well contrasted, so that their condition shall be pointed and good—the green-edged without a grey tinge, the grey without any decided green in any part of the flower, the white-edged pure white, such as Taylor's Glory would be in good order, and the self with a white eye. The rounder and flatter the pips the better. These four should be uniform if possible, but if not, the self is the only one that should be of a different size, for that is almost out of the pale; and while the three real florists' flowers were uniform, the self might be larger or smaller. If the three are not the same size, all you can do is to place the odd one in the middle and the two even ones on the sides, with the self in front if smaller, and at back if larger than the others. We have, throughout, recommended soft moss in preference to anything else for parting the pips while growing; but next to this cotton lint is the best, though the moss disfigures less, and hangs about less than lint. The importance of using one or the other is paramount; there is no doing well without it.

Miscellaneous Notices.

HORTICULTURAL SOCIETY.

April 2.—The most striking object exhibited was a large plant of a free growing showy species of Medinilla, from Manilla, which was contributed by Messrs. Veitch of Exeter. The leaves of this plant which are large, are rather coarse-looking, opposite and sessile; the stems winged, and terminated by a large drooping panicled cyme of waxy rosy flowers, with broad half membranaceous reflexed bracts of a pinkish colour; it will become a conspicuous stove plant, and was rewarded by the large silver medal. Mr. Loddiges, of Hackney, obtained a certificate for a pretty new Trichopilia, which had been obtained from Costa Rica; it has broad oval leaves, and larger flowers than the common species; the lip is undulated, and prettily spotted with pale rose. Messrs. Rollisson, of Tooting, sent a fine mass of Dendrobium macrophyllum, and of Oncidium sphacelatum; along with the rare Bornean Cypripedium Lowii, which has broad, rosy-tipped, wing-like petals; the pretty yellow Epimedium pinnatum; and a double-flowered Auricula, with deep purple flowers, called Primula Auricula nigra plena; the two last are very desirable Alpine plants. The collection received a Banksian medal. From Chatsworth, Mr. Paxton sent a fine mass of cut flowers of Ansellia africana. Mr. Williams,

gardener to C. B. Warner, Esq., of Hoddesdon, had a small plant of the curious Cypripedium caudatum, to which a certificate was assigned; the rare and pretty Cœlogyne cristata, and some other orchids.

Messrs. Jackson and Son, of Kingston, contributed a seedling Camellia, called Countess of Ellesmere, a pretty cupped white flower, slightly marked with pale rosy purple; the petals are tolerably firm, but rather serrated on the edges, and the centre is a little confused; the flower, however, is very superior to most of the same class, and having good foliage, will prove an acquisition. From Mr. Glendinning, of Chiswick, was a seedling Heath, of the aristata breed, for which a certificate was awarded; it is apparently a cross between E. ampullacea vittata, and aristata major, producing long slender flowers of the colour of aristata; the plant appears of stubborn growth, and, though desirable, will doubtless be scarce for some years to come. Azalea Gladstanesii magnifica, a seedling, was sent by Mr. Ambrose, of Battersea, but being inferior to its parent, is, though pretty, not of much importance. From the garden of J. Dimsdale, Esq., Mr. Plumbley sent Erica Willmoreana, a large plant almost in a state of nature, but finely blossomed; E. transparens in a similar state; the rare and curious E. penicillata; and the large white flowered E. triumphans. Messrs. Henderson sent an hybrid Gloxinia, a pale lilac variety, with richly pencilled throat, called Frederic Lenning; and six small blooming plants, not more than three inches in height, of Cantua bicolor.

The plants from the Society's Garden comprised, among others, the Dielytra spectabilis, a herbaceous perennial of great beauty, supposed to be hardy; Nuttallia cerasiformis, an inconspicuous shrub from California; the fragrant Rhynchospermum jasminoides; a large plant of Henfreya scandens; Boronia tetrandra, called in nurseries B. microphylla—a species with pale coloured flowers, and pinnate leaves with linear segments; and Acacia ovata, a kind suitable for pot-culture. Several Cinerarias were also sent, among which Adela Villiers and Coronet were the best; the others, Royal Crimson, Candidate, and Bellina, though new, being very coarse.

Of Fruit, Black Hamburgh Grapes, beautifully ripened, were sent by Mr. Mitchell, of Kemp Town, Brighton; and some Keens' Seedling Strawberries, good for the season, came from Mr. Higgs, gardener to J. Barchard, Esq. Of inventions, Brown's Fumigator, a useful instrument, was exhibited; and a scheme for the maturation of wall-fruit, by means of bell-glasses, was shown by a person from Kensington.

NEW AND RARE PLANTS.

Berberis Wallichiana, *De Candolle.* Wallich's Berberry. (*Journ. Hort. Soc.*, v., 4.)—Nat. Ord., Berberaceæ, § Berberideæ.—Syn., B. atrovirens, *Don;* B. macrophylla, of *gardens.*—A beautiful evergreen shrub, five to ten feet high, and hardy, or nearly so. The branches are armed with long, slender, three-parted spines. The leaves are dark green, growing in clusters, dense, three or four inches long, oblong-lance-shaped, with a sharp point. The flowers are clustered from the axils of the leaves, and are of a pale yellow colour.—From Java: mountains at an elevation of 9,000 feet; introduced, in 1845, by Mr. T. Lobb. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter.

Nuttallia cerasiformis, *Torrey* and *Gray.* Bird-Cherry-like Nuttallia. (*Journ. Hort. Soc.*, iv., 222.)—Nat. Ord., Rosaceæ, § Quillaiæ.—A dwarf, deciduous,

hardy shrub, growing two feet high, and bearing thin, half-transparent, oblong, or oblong-ovate leaves, pale green above, and rather glaucous beneath. The flowers—which are small, five-petalled, greenish-white—grow in nodding racemes, which spring from the base of the young shoots, opposite one of the earliest leaves; they are produced before the leaves are developed, and soon fall.—From California: woods near Monterey; introduced, in 1848, by Mr. Hartweg. Flowers in February and March. Horticultural Society of London.

Berberis Darwinii, *Hooker.* Darwin's Berberry. (*Journ. Hort. Soc.*, v., 6.)—Nat. Ord., Berberaceæ, § Berberideæ.—A beautiful, evergreen shrub, growing three to five feet high, and apparently quite hardy. The branches are of a rusty brown colour; the leaves deep shining green, small but densely placed, about three-quarters of an inch long, with three large, spiny teeth at the end, and one or two on each side, near the middle. The flowers are deep orange, and grow in erect racemes.—From Chiloe and Patagonia: mountains near the summer limit of snow; introduced in 1846. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter.

1. Ceanothus papillosus 2 C. dentatus.

CEANOTHUS PAPILLOSUS AND DENTATUS.

Nat. Order, Rhamnaceæ.

Generic Character.—Ceanothus, *Linn.*—*Calyx* campanulate, five-cleft, the upper portion at length separating by a transverse line, the tube adhering to the base of the ovary. *Petals* five, longer than the calyx, saccate and arched, on long claws. *Stamens* exserted; anthers ovate, two-celled. *Disk* fleshy at the margin, surrounding the ovary. Styles three (sometimes two), united to the middle, diverging above. *Fruit* dry and coriaceous, mostly three-celled, (rarely two to four, or by abortion one-celled), obtusely triangular, girt below by the persistent tube of the calyx, tri-coccous; the cells at length opening by the inner suture. *Seeds* obovate without a lateral furrow.—(*Torrey and Gray, Fl. of N. America.*)

Ceanothus papillosus.—*Torr. and Gray.*—Papillose Ceanothus.—Branches tomentose, leaves narrowly oblong, much crowded, fascicled in the axils, densely and softly tomentose beneath, glandularly denticulate on the margin; peduncles aggregated; clusters somewhat capitate; ovary triangular, the angles projecting at the summit.—*Torr. and Gray.*

DESCRIPTION.—Branches and peduncles tomentose with rusty hairs. Leaves averaging one inch and a half long, narrowly elliptic, oblong, obtuse, crowded, with smaller ones fascicled in the axils; tomentose beneath, pitted, with projecting veins, the margins with minute teeth tipped with capitate glands, revolute, the upper face somewhat shining, papillose (the elevations corresponding to the pits on the under side, thus resembling indentations made with a blunt point on the under surface), with scattered hairs, especially while young. Peduncles axillary, elongated, sometimes with one or two small leaves: aggregated at the summit of the branches. Clusters of oblong, somewhat capitate racemes; pedicels 3-4 lines long, filiform, deep blue, in the axils of caducous woolly bracts. Calyx and corolla blue, anthers yellow.—A. H.

Ceanothus dentatus, *Torr. and Gray.*—Toothed Ceanothus. Branches and peduncles hairy-tomentose, leaves oblong, sometimes rather cuneate, very obtuse, or deeply emarginate, crowded, with smaller ones fascicled in the axils; downy beneath, margins revolute, irregularly toothed, teeth minute, tipped with capitate glands, slightly downy above, becoming almost glabrous. Peduncles axillary, often remote from the summit of the branches, elongated, divergent, with small scattered bracts. Clusters almost globose, crowded at the ends of the peduncles, with woolly bracts; pedicels short, woolly.

DESCRIPTION.—Much resembling the former in habit. Branches and peduncles hairy-tomentose (scarcely rusty). Leaves numerous, varying much in size from half to three-quarters of an inch long, oblong, or sometimes rather cuneate, very obtuse at both ends, or deeply emarginate at the summit; smaller ones fascicled in the axils; downy beneath; margins revolute, irregular, with minute teeth, tipped with capitate glands; upper face slightly downy while young, becoming almost glabrous; the whole plant rather viscid. Peduncles much elongated, divergent, axillary, often at some distance from the summit of the shoots, with several scattered bracts. Clusters close, almost globular, with woolly bracts which do not fall so soon as in *C. papillosus*; pedicels short (1 line long), bluish, clothed with close white pubescence. Calyx and corolla blue, rather paler than in *C. papillosus*, anthers yellow. The above description differs in certain respects from that of *C. dentatus*, as given by Torrey and Gray, in *The Flora of North America*, which is accounted for by these authors having described the species from dried specimens. It was figured in *Paxton's Flower Garden*, for April, 1850.—A. H.

History.—The above beautiful acquisitions are both natives of California, whence they were introduced by the Horticultural Society through their collector Mr. Hartweg. Of the precise locality where they were found we have no information; neither is it quite certain whether they are hardy or not. We saw them, however, a few days back in the garden of the Horticultural Society at the foot of a wall where they had been all the winter, and apparently uninjured. Whether they prove hardy or not is comparatively of little importance, as grown either as pot plants for conservatory decoration, or against a conservative wall, they will be found very beautiful. For the opportunity of figuring them we are indebted to E. Fellows, Esq. of Blackheath Park, in whose conservatory they have been blooming for some time past.

Culture.—Though less gay, and altogether different in habit, from that old but general favourite, Ceanothus azureus, these plants, under good management, will be found very desirable—alike interesting, whether viewed as plants of elegant habit, compact growth, or profuse in the production of flowers. As specimens for the decoration of the greenhouse or conservatory, they are very interesting, and for early forcing we know nothing better. To grow them to perfection, take well-established plants at the present time, and give them a liberal shift into good rich soil, say two parts loam, one part leaf mould, and one part turfy peat, liberally inter-

mixed with silver sand. If the plants are strong they may be shifted from a three to a six or eight inch pot at once, but if the shift is a large one, more caution must be used in watering, until the plants are thoroughly established. After shifting, place the plants in the greenhouse, or a close frame, maintain a close atmosphere, and syringe daily in bright weather. This treatment should be commenced in March, and the plants should be grown vigorously until July, at which time it will be necessary to expose them to the full sun to ripen the wood and set the bloom. During their growth take care to stop the shoots regularly, so as to induce a compact habit, and also to get a great quantity of small short stiff branches, as these are the most likely to produce flower buds. A plant properly grown and trained into a pyramidal form will attain a height of from two to three feet, and eighteen inches or two feet in diameter at the base, in one season; and such a plant, either forced into bloom, or allowed to flower naturally, will be found a very interesting object. These plants we find first rate for forcing, coming into bloom very surely and rapidly, and continuing a very long time. After the plants have produced their flowers they should be cut in pretty closely, be allowed to rest for a few weeks, and then be started into free growth. In the second season they may be allowed to make their growth in the open air, taking care to shift them when necessary, and to curb exuberant growth. Those, who want early flowers for the conservatory, will find a dozen or so of these plants very useful. Planted against a south wall, and protected in severe weather, no doubt both these species of Ceanothus would succeed, and, should they prove quite hardy, we can imagine nothing finer as lawn shrubs. Where planted in the open air, the soil should be porous and not too rich, so as to induce short, compact, and well matured growth.—A.

THE PREPARATION OF THE POLYANTHUS FOR EXHIBITION.

By Mr. GEORGE GLENNY, F.H.S.

IF the exhibitor of the Polyanthus is determined to grow them in pots, there should be a very different system pursued to any we have yet seen adopted; we have known some of the best growers in England grow them in the ground, and pot them for exhibition, and the only drawback to this is, the chance of injury, and the consequent flagging of the plant. Plants so treated, sent from a distance, by the time they are set up for show generally have the trusses, which might have been close, opened, and the footstalks all flabby, and the plants evidently drooping. The taking up from the ground and potting, must, therefore, be done well, so that the plant does not feel the move. It stands to reason, that a truss of flowers which touch each other, because the stiff and elastic footstalks hold them there, will be loose and ugly, if the footstalks droop ever so little, or lose in the most trifling degree their elasticity. But the Polyanthus, if grown in pots for show, and intended for exhibition against good growers, must be in very different pots to those in which they are produced. A strong fine root of Tantarara, or any of the fine large sorts, would require a 9-inch pot. The Polyanthus wants quite as much room as a Carnation or Picotee, and the fashion to show them in pots, crowded with roots, and not large enough to flower them properly, is much against the quality of the bloom.

The Polyanthus should be reduced to seven of its best pips, and the plant restricted to a single truss If we have to pot up a plant from the ground, let the earth first be soaked the day before, down to the lowest part of the roots; then dig round it, at sufficient distance to be beyond the fibres, and, when deep enough, put the spade under, and lift the mass out; when this is done, reduce the ball carefully to the size of the pot, so that it will just go in; and, as it is essential to fill up the sides of the ball solid, let it be done with dry silver sand, which will run into every crevice, and, when watered, will be quite solid; at all events, if there be any holes or vacancies, a further supply of sand will complete it. There will be no flagging here, unless the fibres have been broken in reducing the ball, but, as you see what you are about, all the while you reduce it, you would naturally desist if you come to any of them.

Polyanthuses so potted up are objected to at some shows; but, unless it is to encourage pot culture, instead of good culture, without any reference to pots, it is trifling to make the objection. If, however, you are not allowed to pot up, and must grow all the while in pots, let the last shift be in full a size larger pot than they are ever grown in now; because, we think they are somewhat starved; at least, all we ever saw, appeared starved, compared with their brethren in the open border. We have no doubt nor difficulty about growing the Polyanthus in pots; but even those who grow the plants all

manner of ways, can beat those in pots always, by taking plants from the borders. The diminutive plants we have seen shown, look like caricatures of the flower; and, we confess, that we could hardly believe our own eyes when we have seen such pigmy growth rewarded with a prize; nor can we admit the justice of an award that recognises the right of a flagging plant to a distinction of any sort. Such specimens give us a very poor notion of their growth in general. The potting up system will be found the best for all that, unless they are grown in small Carnation pots.

DOMESTIC GARDENING.—Classification of Cultivated Plants.

By Mr. J. SPENCER, C.M.H.S., Gardener to the Marquis of Lansdowne, Bowood.

NOTHING presents so sure an index of the comparative prosperity of the middle classes, and the more refined nature of their pursuits, than the interest felt by those for whom these papers are more especially intended, in all that relates to the cultivation of their gardens, and the great thirst which exists for information respecting their management. Nor, need we be surprised that such is the case, if we consider that of the many recreations affording us enjoyment, a love of gardening appears to be the only one which may be indulged in, without causing any sacrifice of feelings, even to the most sensitive minds; and we generally find the attachment for gardening and rural affairs increases with advancing years, and is relinquished only with life. What other occupation or recreation embraces so wide a sphere of thought and contemplation as the one whose humble advocate we are; pleasing us, as an old author admirably writes, "*Delectando pariterque monendo.*"

Before proceeding with plans explaining what I conceive to be proper structures for growing exotic plants, &c., I beg to digress somewhat, for the purpose of arresting the reader's attention, while I briefly explain the laws which govern and regulate vegetable life; for it is necessary that the principles on which vegetable life depend should be comprehended before anything like an attempt at cultivation, properly so called, be made.* The domestic gardener must understand, that although speaking in general terms, cultivated plants are subject to the same set of laws which prevail generally in the Vegetable Kingdom; yet a broad difference in successful cultivation will be found to exist between plants included in the several classes here proposed, which I hope will form some guide in subsequently attempting their cultivation.

Class 1. Division 1.—Plants grown for their leaves or stems only, as the Cabbage, Celery, Spinach, Lettuce, Rhubarb, Asparagus, &c.
,, ,, 2.—Plants grown for their embryo or unripe fruit, as the Cauliflower, Brocoli, Bean, Pea, French Bean, Cucumber, &c.
Class 2. Division 1.—Plants grown for their roots only, as the Potato, Carrot, Turnip, Radish, &c.
,, ,, 2.—Onion, Shallot.
Class 3. Plants grown for their ripe fruit only, as the Grape-vine, Peach, Apple, Pear, Raspberry, Melon, &c.
Class 4. Division 1.—Plants (soft-wooded) grown for flowering specimens, as the Pelargonium, Cineraria, Calceolaria, Fuchsia, Pot Roses, &c.
,, ,, 2.—Plants (hard-wooded) grown for flowering specimens, as the Heath and Epacris tribes, and most New Holland Plants.
,, ,, 3.—Intermediate Plants grown as flowering specimens, or for the beauty of their foliage or habit, as the Orange, Camellia, and many stove plants.
Class 5. Plants grown for their individual flowers, as the Dahlia, Tulip, Carnation, Rose, &c.
Class 6. Plants grown to ornament borders, beds, vases, &c., as herbaceous and hardy bulbous plants, Verbenas and summer flowering plants in general.

It will be at once conceded that principles, differing greatly with each other, are involved in the cultivation of the above classes, which, though in some respects imperfect, will help to illustrate the view I take, in reference to forming plants, requiring something like a similar course of treatment, into distinct classes, which, when once comprehended, will materially assist the non-professional gardener, in proceeding on a correct basis. There are few gardens even of the most moderate pretensions, which do not embrace several of these classes, each requiring a difference in their management, which can only be attained by long practice, and a considerable knowledge of vegetable physiology. Need we wonder then, that where the commonest ideas on these subjects are wanting, gross blunders are daily being committed, which the slightest acquaintance with the general habits of each class would have modified if not entirely prevented.

* As a series of very able articles on Vegetable Physiology is being published in these pages, I beg the reader carefully to study the papers in question.

To speak briefly on the subject, the domestic gardener will understand that all plants derive the elements of their growth from two sources—the earth in which they grow, and the air; that the ingredients derived from the soil are principally inorganic substances, contained in the soil itself, as the various salts, earths and minerals, each of which are necessary for the plant's growth, and which are absorbed in a soluble form, either in a free or combined state, by the spongelets or extreme points of the roots. These form, however, only a small portion of the plant's bulk—the larger portion, consisting of carbon, being derived from the air, by a principle of action which all plants possess in a greater or less degree, whereby they assimilate the carbon from the carbonic acid constantly found in the atmosphere by the aid of solar light; and by these combined operations plants are enabled by their "vital force" to procure for themselves all the necessary elements of their growth, provided the plant is placed in a soil where it can obtain the requisite amount of food on the one hand, and is exposed to light and air on the other.

ON GROWING PARSLEY FOR THE WINTER.

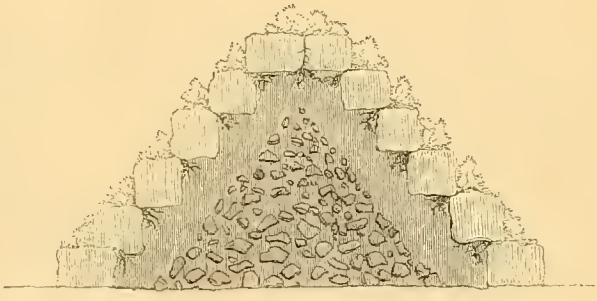
By Mr. P. F. KEIR.

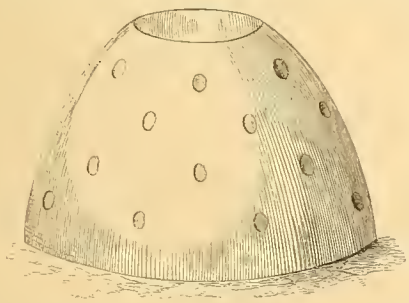
THE preservation of Parsley in a fresh and green state during the winter season, is frequently attended with much difficulty where the convenience of frames is not available for this purpose. In the more northerly counties, indeed, Parsley is only to be procured at much expense during nearly six months out of the twelve. The leaves of this useful vegetable, when grown in the open ground, are generally destroyed by frost; but if the circumstances attending their destruction are fully considered, it will be found that the stems are most rapidly affected where the soil is stiff and moist, and where the situation is exposed to cold cutting winds. The plant, however, does not appear to be so delicately constituted but that it may be had with comparative ease all the year, if the ordinary conditions of growing the less hardy plants during the winter are observed. Some varieties are, perhaps, more susceptible of cold than others. The finest sample I ever saw, was grown on the west coast of Scotland by a village schoolmaster. It was of a beautiful green colour, and of a remarkably vigorous habit; but growing in a low situation, and exposed to cutting sea-gales, the leaves always died down during winter.

In ordinary situations, Parsley may be grown successfully on a border having a south aspect, and protected from the north by a wall. The soil should be light and rich. A quantity of stones and brick rubbish should be laid at the bottom to the depth of seven or eight inches, so that the bed may be raised considerably above the general level of the ground, and thus ensured against excessive moisture. The surface of the soil being properly raked, seed of the most curled variety that can be obtained should be sown very thinly, either in shallow drills or broadcast, and slightly covered with fine soil. This operation should be begun in May or early in June, and if the weather continue dry, frequent waterings will be necessary. The young plants will have sprung up in six or seven weeks, and when large enough, they must be thinned out to four or five inches apart. They will have become large and vigorous by the end of the autumn, when a number of stakes should be driven into the ground along each side of the bed. These stakes should be of a thickness to permit of their being bent across and tied together so as to form a series of arches, and strong enough to support a covering of mats, which should be laid over them as soon as the weather becomes frosty and wet. During intense frost, especially at night, it may be necessary to increase this protection by doubling the mats; but these should be removed entirely while the weather is mild. The soil should be kept as dry as may be, and all decaying matter carefully removed from the plants. A bed four feet and a half wide, by ten feet long, will contain as many plants as may be sufficient for an ordinary supply during the winter.

Parsley might also be grown on a sort of rock-work with great certainty and convenience; for on such a structure the roots and stems could be kept in that dry state which is so indispensable to their health, and freshness in dull cold weather. For growing it in this way, it is recommended to sow a quantity of seed, early in May, in a bed of light rich soil on a south border. When the young plants are a little above the ground, they should be thinned out to six or eight inches apart, kept clear of weeds, and watered as occasion requires. At the end of August, or early in September, collect a few barrow-loads of moderately large stones, selecting such as are best suited for forming a rock-work. They should be longer than broad, somewhat flat or even at the sides, so that they may lie firmly in their places when built up. Any kind of stones which the district may afford will do, but those of a sandy or porous composition, should be preferred when a choice is offered. Bricks may also be used, but they are, perhaps, too flat, and do not present those holes and crevices which are desirable in the formation of rock-work, and which may generally be secured by the use of stones. The

site being chosen in some sheltered open part of the garden, the stones and a quantity of good friable sandy loam, with some brick rubbish or rubble, should be collected together. The rock-work must be determined according to taste and requirements, in respect to form and size, but there is no use in having it too large. Perhaps the oval form is the most convenient for building such a structure, and if the base is five feet long, a pile may be raised with a surface extensive enough to grow a sufficient supply for an ordinary family. The stones used in forming the first tier, or layer, may be about eight inches high, and kept closely together; a quantity of soil should be worked in at the back and sides so as to keep them together, while the centre may be filled with ordinary brick, or sand-stone rubbish. When the first layer is completed a portion of soil should be laid over the stones at the sides, and a number of plants of Parsley taken carefully up from the bed in which they have been growing, should be planted as regularly as possible in all the holes and crevices, their roots being spread out in the soil, and their stems and leaves kept inclined outwards at the margin. Having fixed the plants properly, proceed to erect a second tier in the same way, and so on, with the others till the pile is raised to the height desired. But with the subsequent tiers keep the stones four or five inches nearer the centre all round, and about an inch or so apart. Every stone should be placed directly over the point which forms the junction of those immediately below it; and every additional tier which is raised must be kept three or four inches nearer the centre than the one preceding it; so that when the whole structure is completed, an imaginary section of it would appear thus. In this arrangement of the several tiers, the plants will not come directly over another, and the soil will not be washed down from the interstices by rain. If, at the time of building the rock-work, the weather is dry, the soil about the plants must be well soaked with water; but this must be done by limited supplies repeated several times, for if much water is poured on at once, a portion of the soil will run down. To prevent the action of drenching rains from having the same effect, it will be necessary to provide the winter covering at once. A number of stout ash sticks must be driven into the ground about twelve inches from the bottom of the rock-work, and attached by a good strong cord, so near one another that they may form an open arching figure at the top; and so placed that at any point they may be twelve or eighteen inches clear of the plants. A covering of oil-cloth or common canvas should be provided and kept in readiness to protect the mound from heavy falls of rain until the soil has become consolidated round the sides. This covering will also be available during intense frost, when it must be carefully laid over the whole frame of sticks, and removed whenever the weather is mild and open. In eight or nine weeks the pile will have become covered with strong healthy plants, which besides affording a continual supply, will form an agreeable object both in summer and winter. It may be urged that by this plan of growing Parsley, the roots are liable to become dry in summer, but in admitting the probability of such a circumstance, we must bear in mind that if the plants could be kept from growing too vigorously during the summer months, they would be in the best condition for preservation during frost. Now the drought of a hot summer would have the effect of retarding them, and conserving their energy until the time when their growth was most desirable. Besides, any extreme dryness could be very easily prevented by timely applications of water.





In a recent number of the *Revue Horticole*, I observe a notice of a Dutch method of growing Parsley during winter. The practice is to sow the seed in March so that the plants may be vigorous enough for removal by the end of September, when they are planted in large pots, somewhat similar in form to what is used in England for blanching Sea Kale, or, perhaps, rather like the annexed figure. This vase is open at the top, and perforated with large holes all round. In September it is filled with soil, and the plants are inserted in it at the holes, their stems and leaves being kept outwards. This vase may be made to any size, and as ornamental as taste may determine.

Miscellaneous Notices.

Ammoniacal Manures.—The following are the results of the experiments of Kuhlmann, on the effect of Ammoniacal Manures upon the produce of meadows :—

No.	Nature of Manure.	Quantity per Hectare.	Crop per Hectare.	Nitrogenous contents of the Manure.	The Meadow, therefore, delivered more than the unmanured one, as follows:
		Kilogr.	Kilogr.		
1	No manure	—	4,000	—	—
2	Sulphate of ammonia	266	5,233	50·08	12·33
3	Hydrochlorate of ammonia	266	5,716	70·33	17·16
4	Nitrate of soda	266	5,723	44·10	17·63
		Litre.			
5	Urine of horses	21,666	6,240	349.27	22·40
6	Ammoniacal water from the gas works	5,400	6,300	?	23·00
7	Water from animal bone-mills	21,666	6,493	938·14	24·93
8	Flemish manure	21,666	7,433	43·22	34·33

A hectare = 2·471 English acres; a kilogramme = 2·206 English pounds; a litre = 61·027 English cubic-inches. The experiments were instituted in rainy weather. The salts of the manure were applied on the 28th March, and the harvest took place on the 30th June. The ammoniacal water (No. 6) was neutralised by the hydrochloric acid of the glue manufactories, and thus a precipitate of phosphate of lime was applied to the meadow. —*Comptes Rendus.*

Potato Disease.—We regret to be the first to announce the re-appearance of this disease among forced potatoes. In the garden of E. Fellows, Esq., Blackheath Park, it showed first on Good Friday, the haulms having flagged as if struck by lightning; but, upon examination, we found the base of the stem quite covered with gangrene, and the young roots dead. The tubers at the present time are not affected, the pit having been kept warm and dry; but no doubt, under ordinary circumstances, in the open air, they would have been entirely worthless by this time. With forced potatoes the best system of management is to shut the frame or pit up close directly the disease appears, and keep it as dry and hot as possible, until the crop is gathered.—A.

Frame Protection.—I am glad you have already taken up the subject of coverings for frames, &c. I do not think the gardener has a greater enemy than the Russia mat. I do not care, like Mr. Cobden, to prevent Russia loans, but I own I should like to ruin the trade in Russia mats; they are dear at 1*s.* to 1*s.* 6*d.* each. They rarely, even with care, last more than one season, and, when wet or frozen, are worse than useless; and employers are always complaining of the annually recurring demand for new mats. We have here entirely superseded them by the use of wooden shutters the size of the lights, made of half-inch deal, supplied from Mr. Montgomery's saw-mill at Brentford, at 8*s.* per 100 feet; these are secured together the size of the lights, by a lath one inch and a-half thick, top and bottom, thus leaving a space for air, between the shutter and the glass, and the protection is equal to at least three mats; and if these shutters are put away dry in the summer, they will last from seven to ten years. We have also applied these wooden shutters to the back or north lights of a small span orchid-house with great success, making, I believe, at least five degrees temperature during the night in favour of the shutters. I expect that these will also be found very useful in the summer for protecting from the sun fresh-planted vegetables, as well as for other shading purposes in the garden. The great object, as regards glass, being to get a body of non-conducting matter between the covering and the glass, I feel certain that we shall never attain complete success in orchid culture till we have houses with double sashes; and the cheapness of glass, and the facility there is of obtaining large panes, would render an experiment of this kind easy and not costly; indeed, double sashes would not be necessary, as the sash-bars and frame might be two inches and a-half thick, and the rebate at top and bottom, so that it would be a double-glazed sash. I suspect, with this protection, any degree of moisture and of temperature might be kept up in the house, with very little fire-heat.—*J. Wooley, Cheshunt.*

NURSERY CALLS.

Messrs. Lee, Hammersmith.—March 1.—The collections of plants in this ancient nursery are undergoing revision and renewal under the active personal superintendence of Mr. C. Lee, who has already effected considerable improvement within a few months. One of the most interesting features in the establishment is the collection of Cacti, which is very extensive, and contains not only an immense number of plants, but many very fine specimens in a flourishing condition. One or two beautiful species recently figured in the *Botanical Magazine* by Sir W. Hooker, had been received at Kew from the Messrs. Lee's collection. One of these, Cereus Leeanus, has beautiful vermilion flowers, on stoutish upright cylinder-shaped stems; and another more recently bloomed, the Cereus Tweedici, has very remarkable and showy bright flame or orange crimson coloured flowers, which are numerous, on the

slender upright nearly cylindrical stems. Mr. Lee considers the common plan of cultivating the various Cacti, in nearly pure loam, to be erroneous, and maintains that they should have a much richer, though perfectly porous soil. The collection of Heaths here is extensive; and a fine healthy stock of most of the leading kinds was being brought forward. In the propagating house we noticed a very useful contrivance for aiding the establishment of newly potted plants. Wide shelves were fitted up with a deep front ledge, and covered with small glass sashes hung at the back, and fitting closely, thus forming a series of close glazed boxes, which were found very useful for the purpose just mentioned, and much more convenient than ordinary hand-glasses which are commonly used for the same purpose. In one of the houses was a plant or two of a beautiful Lycopodium of small growth, called L. dendroideum, a Canadian species, with running underground stems, the portion above ground having a tree-like drooping character, similating a miniature Araucaria. A nice young stock of the Flower of the Day Pelargonium (see p. 25) was in course of propagation. It is a very handsome foliaged plant, and with flowers more cherry-coloured than our plate indicates.—M.

Messrs. Chandler, Vauxhall.—March 8.—This establishment has long been celebrated for its magnificent collection of Camellias. We found the plants in splendid condition, but, owing to the very cold weather which had prevailed, some of the choicer kinds were not quite sufficiently expanded. They are grown in an unusually long lean-to house, the back being covered with plants growing in the open ground. Some of the specimen plants, also, are planted out. Among the more remarkable or showy kinds, we noted Coronata, rose colour, very pretty and late; Albicans, pure white, small, but very pretty, and tolerable in form; King, in the way of Colvillii, of fine habit, pure in colour, and distinct in the markings; Fimbriata, and Old White, remarkable for their unusually large and beautiful flowers. In addition to these we also noticed Floyii, desirable for the richness of its large bold foliage; Albertus, a fine plant in very superior condition, and very showy; Teutonia, a variety sometimes producing, upon the same plant, flowers all white, and, at other times, all pink; Reine de Fleur, a deep red flower of the Donklaerii breed, but much finer and of good form; Vandesii Superb, an old showy kind, rarely seen in bloom, but producing some prodigiously large flowers; Elegans, a noble plant, clothed with immense flowers of a pale red colour, blotched with pure white—this variety, though coarse and deficient in form, is, as grown at Messrs. Chandler's, one of the finest, and deserving a place in any conservatory; Tricolor, a plant of fine habit, and very showy; and Traversii, a deep red of very nice form. Henri Favre is a late kind of pretty good form; and Triumphans is a desirable large rose kind. Fine bushes of Imbricata and Corallina, covered with flowers, were very conspicuous; as were also Eximia, Donklaerii, Reticulata, Woodsii, and Sanguinea, the last named showing a very full centre of yellow anthers. The young plants, as is generally the case, were not this season very full of bloom. The other houses, in addition to the general stock, were gay with forced American plants and bulbs, among which the white Pyrus japonica, and Persian Lilac, with yellow, pink, and red Azaleas, were very conspicuous. We also noticed Daphne Fortunii, blooming profusely; and Tropæolum Lobbianum, in small pots, producing a greater abundance of brilliant orange scarlet flowers than we have ever before seen; this proves an excellent plant for winter blooming, and is a good substitute in bouquets for scarlet Geranium. A fine Rhododendron was showing colour in the open ground; and, upon the wall, we noticed some splendid plants of Camellias, and Magnolia conspicua a mass of flower buds.—A.

Messrs. E. G. Henderson.—March 19.—We here saw a beautiful dwarf Gesnera, called macrantha purpurea, said to be a cross between G. macrantha and Cooperi; it is a most beautiful variety, and is said to have the very desirable property of producing a new crop of blossoms in about six weeks after cutting away the remains of the first set of flowers. Messrs. Henderson have also bloomed the Conoclinium ianthinum, which appears to be a free-growing and easily flowered soft-wooded warm greenhouse plant, producing corymbs of bluish-lilac flower-heads in the way of an Ageratum. A Gloxinia called argyrostigma, in the young state promises to have very ornamental foliage of moderate size; it has the veins marked by a broad clear white streak, and a velvety surface, here and there tinted with brown, something in the way of the leaves of Achimenes picta, with which, from its tendency to form a stem, it is not improbable that the parent of this variety had been fertilized. Pimelea Nebergiania (not Weippergiana) was coming into flower. Among other novelties were Heintzia tigrina, a conspicuous gesneraceous plant, with crowded axillary cymes of curiously spotted flowers from the axils of the ample leaves; Aristolochia picta, whose flowers have a blue limb, chequered with golden veins; and a handsome Pandanus called variegatus.—M.

Messrs. J. and A. Henderson.—March 19.—Here many very beautiful varieties of Amaryllis were in flower. A successful display of these gaudy subjects is kept up throughout the winter, for which purpose they are found to be invaluable. One of the most remarkable was A. reticulata, with beautiful light pink flowers, prettily veined with deeper red. Some plants of the double white and purple varieties of Primula sinensis were remarkable for their size and vigour, and the profuse mass of blossoms they were producing. A house filled with finely grown specimens of greenhouse plants contained some Eriostemons, and an Acacia diffusa beautifully bloomed. An Epacris called hyacinthiflora candidissima, is one of the finest of the white varieties, and was, we believe, raised by Mr. Storey; it has the habit of the Impressas, with flowers of twice the size. Boronia triphylla, one of the prettiest of all the species, was flowering very freely, its bright rose-pink blossoms contrasting to much advantage with a species of similar habit—B. anemonæfolia, whose flowers were both fewer and smaller, with a dingy foliage. A now old plant, not much seen, Chorozema platylobioides, or Mirbelia grandiflora, was prettily in flower, and is rather showy.—M.

NEW AND RARE PLANTS.

Grammanthes gentianoides, *De Candolle*. Gentian-like Grammanthes. (*Flora*, v., t. 518.)—Nat. Ord., Crassulaceæ, § Crassuleæ.—Syn., Crassula gentianoides, *Lamarck*.—A pretty, dwarf, greenhouse, half-hardy annual, with white brittle stems a few inches high, and blunt, oblong, succulent leaves. The flowers are numerous, in hemispherical clusters, three-quarters of an inch in diameter, salmon-coloured, stained in the centre in the form of a letter V.—From the Cape of Good Hope; introduced in 1849. Flowers in summer.

Myanthus fimbriatus, *Morren*. Fringe-flowered Myanthus.—Nat. Ord., Orchidaceæ, § Vandeæ-Catasetidæ.—A curious and very beautiful stove epiphyte. It has ovate, elongated pseudo-bulbs, producing lance-shaped, plaited leaves. The flowers grow in drooping racemes, on scapes issuing from the base of the pseudo-bulbs; the sepals are narrow, lance-shaped; the petals broader and shorter; the lip heart-shaped, fringed round the margin, produced behind into a blunt spur; the petals are connivent with the upper sepal. The petals and sepals are of a pale, rosy, purplish hue, speckled

with red spots; the lip creamy white, suffused with rose, in the variety Heynderycxii; in another variety—Legrellii—the colours are green and white.—From Brazil: marshes near the Villa Franca, province of St. Paul; introduced to Belgium in 1847. Flowers towards autumn. M. de Jonghe, of Brussels.

Dipteracanthus spectabilis, *Hooker*. Showy-flowered Dipteracanth. (*Bot. Mag.*, t. 4494.)—Nat. Ord., Acanthaceæ, § Echmatacanthi-Ruellieæ.—A showy sub-shrubby stove plant, of herbaceous aspect, growing two feet or more in height, with numerous four-angled

stems and branches, bearing opposite, nearly sessile, ovate-acuminate leaves, which are ciliated, and slightly pubescent. The flowers, which are nearly or quite sessile, grow two together from the axils of the upper leaves; they have a funnel-shaped curved tube, and a purple-blue veined limb, more than two inches across, of five round spreading crenate lobes, the two upper ones smaller.—From the Andes of Peru; introduced, in 1848, by Mr. W. Lobb. Flowers at the latter end of summer. Messrs. Veitch and Son.

Pholidota clypeata, *Lindley*. Clypeate Pholidota. (*Journ. Hort. Soc.*, v., 37.)—Nat. Ord., Orchidaceæ, § Epidendreæ-Cœlogynidæ.—A stove epiphyte, resembling P. imbricata. The pseudo-bulbs are two inches long, bearing a dark green leaf, and brown and white flowers, in a spike about three inches long; the column is like a three-lobed petal, bordered with brown, and gives the flowers the appearance of having two opposite lips.—Said to be from Borneo; introduced in 1847. Flowers in winter. Mr. Low, of Clapton.

Trichocentrum tenuiflorum, *Lindley*. Slender-flowered Trichocentrum. (*Paxt. Fl. Gard.*, i., 12.)—Nat. Ord., Orchidaceæ, § Vandeæ-Ionopsidæ.—An uninteresting stove epiphyte, of which the pseudo-bulbs and leaves are undescribed. The flowers are small, dingy brown, and white, with linear sepals and petals, and an almost linear obovate lip.—From Brazil: Bahia; introduced to Paris, about 1848, by M. Morel. Flowers in January.

Warrea Lindeniana.

WARREA LINDENIANA.

Nat. Order, Orchidaceæ.

Generic Character.—Warrea, *Lindley*. *Flowers* sub-globose, sub-regular, spur short and rounded. *Labellum* continuous, undivided, with elevated fleshy lines in the middle. *Column* semi-terete, clavate. *Pollen-masses* four, inserted in pairs in the short, linear *caudicula*, with a triangular gland.—*Lindley Bot. Reg.*, xxix., p. 14, 1843.

Warrea Lindeniana, *Hort.*—Linden's Warrea. Racemes elongated, many-flowered; bracts equalling one-third or one-fourth of the ovary; flowers expanded; sepals and petals lanceolate, concave, slightly acuminated; the labellum heart-shaped, incurved, and again reflexed at each side, bifid at the apex; lilac at the lower part, streaked with purple; elevated lines consisting of a triangular prismatic process, having central and two lateral smaller ridges.

DESCRIPTION.—Pseudo-bulbs, slender elongate-conical, the old ones marked with the scars indicating the position of the bases of the leaves, three or four of which are developed with each bulb. Leaves erect, ensiform, plicate, a foot or eighteen inches long. Rachis from the base of the pseudo-bulb, erect, about two feet high in the specimen figured, with sheathing bracts, many-flowered. Flowers large and expanded; sepals and petals lanceolate, concave, and slightly acuminated; the labellum cordate, with the sides incurved, and again reflected, notched at the point, lilac at the base, and streaked with purple, the raised lines confluent into a thickened triangular mass.—A. H.

History, &c.—This plant which differs considerably in the form of the flowers from W. tricolor, was purchased by Messrs. Henderson, at Mr. Linden's sale, two years ago. It is understood to be a native of Peru. Our figure was taken at Messrs. Henderson's nursery, in January last.

CULTURE OF THE GENUS WARREA.

By Mr. T. APPLEBY, Manager of the Pine Apple Nursery, Edgeware Road.

THIS small family of orchids is exceedingly interesting, and well worth growing. The species have been divided from the large group of Maxillaria by Dr. Lindley; and very properly too, for in habit and culture they are very different from any section of the Maxillarias. They are natives of the western hemisphere, and therefore do not require so much heat as the plants of tropical India; but may be grown successfully in a common stove, amongst Ixoras, Aphelandras, and other plants usually cultivated in such a house. Being terrestrial plants—that is, growing in the earth, in contradistinction to epiphytal, or growing in the air on trees—the soil in which they are grown should be a mixture of peat in a rough state, turfy loam, and half-rotted leaves, in equal parts; these ingredients must be mixed together, but not sifted. The pots should be rather large in proportion to the plants, as they have abundance of long fleshy roots when in a state of vigorous health. Stagnant water is injurious to them; the pots should, therefore, be effectually drained. The best material with which to do this is broken potsherds, used in three sizes—one size being in pieces as large as the palm of a man's hand, the second averaging about an inch and a half in diameter, and the third of the size of hazel nuts. The pots should be of the ordinary form, and ought either to be new when used, or washed quite clean.

The soil, the drainage, and the pots of proper sizes, being all ready and in good condition, potting may be performed; that is, if the plants are in a fit state. That state occurs just when the plants begin to push up young shoots, which, when well managed in other respects, happens about March. Whenever these young shoots are observed, proceed with the operation of potting. In performing this, remove the plant to the potting bench; select a pot of a suitable size—if the plant is healthy it will require a larger pot, but, if not, the same size will be sufficient for the ensuing season; place the drainage in the following manner: the large pieces all over the bottom, the next size upon them, finishing with the smallest size. For large plants, three or four inches deep of drainage will be necessary, and a less quantity for smaller ones; but, mark this, it is better to go beyond enough in the matter of drainage than to fall short of it. A thin covering of moss, or very fibrous peat, laid upon the potsherds, will be useful, inasmuch as it will prevent the finer particles of the compost washing down amongst them, and so clogging up the drainage. When this is all prepared, turn the plant upside down, resting on the hand, with the stems between the fingers, and strike the pot gently upon the edge of the bench, so as to cause the plant to fall into the hand easily; then pick out or shake away all the old soil from amongst the roots; should any of the roots be dead, prune them carefully off close up to the plant, leaving all that are alive. Then examine the plant itself, and clear off all insects, decayed

leaves, and dead or rotting pseudo-bulbs. Next place a layer of the compost upon the drainage; put the long roots in the pot, holding the plant up a little above the level of the edge of the pot; work in, with the other hand, the compost amongst the roots, opening and spreading them evenly through the mass; finish by leaving the plant in the centre, raised up a little above the rim of the pot. Give a gentle shake by striking the pot upon the bench, to settle the soil, and the operation—a very important one—is finished. Remove the plant into the house or stove, set it on the floor, and give a gentle watering, letting it remain in that position till the water drains away, when it may be replaced on the stage or platform. Proceed in the same manner till all the plants requiring potting are finished.

The after treatment is to give plenty of water until the pseudo-bulbs of the year are fully formed, when moisture must be gradually reduced; and also the temperature of the house. This is to induce a state of rest, and to preserve the roots alive through the winter. When that dreary season passes away, a little more heat and moisture may be applied; when, if the plants have grown well, made strong pseudo-bulbs, and kept their roots alive, they will certainly produce flower-stems, and reward the cultivator for his trouble.

These plants are increased by cutting off with a sharp knife one or two of the older pseudo-bulbs, putting them in small pots drained well, and giving no water till the latent buds break out into growth. Then give a little water round the edge of the pot, increasing it as the shoots advance in growth, and begin to push forth new roots. They are afterwards managed in a similar manner to the old-established plants. It will take three years before they will have acquired a blooming size under the best management.

It was stated that this genus was a small one. The species now figured is one of the handsomest of the group. Below is a list of those which are at present cultivated in this country:—

Warrea bidentata. Two-toothed Warrea. Native of Caraccas. The flowers are purple and white.

Warrea cyanea. Deep blue lipped Warrea. Native of Columbia. The whole of the flower is of the purest white, excepting the lip, which is of the most beautiful deep azure blue; a rather delicate species.

Warrea tricolor. Three-coloured Warrea. Native of the Brazils. This is a very robust showy species, lasting a long time in bloom; the sepals and petals are of a delicate white, the lip is striped with brown and purple.

Warrea Lindeniana. Linden's Warrea. Native of Venezuela. This is the subject of the plate, and has occasioned our remarks on the culture of the whole genus.

[In the French gardens is a *Warrea candida* (Lindley in *Paxton's Flower Garden*, i., 32), a native of Bahia, described as being a handsome species, with flowers pure white, the centre of the lip purple, towards the edge blue-violet, at the base white streaked with red. The plant is dwarf, and the flowers grow three together, in the same manner as in the Huntleyas.]

THE HANGING-GARDENS AND CROCUS-MEADOWS OF NOTTINGHAM.

WHERE seems to be an innate love of Nature in every human breast; which, though it may lie dormant during the torpid winter months, breaks forth, and becomes almost irresistible as spring approaches. But it is, perhaps, necessary to be cooped up within the narrow walls of the city, and be subject to the dingy atmosphere and dirty streets of the metropolis, fully to realize the delight, the charm of a peep at the country, when "the winter is past, the rain is over and gone, the flowers appear on the earth, and the time of the singing of birds is come." At such a time, in days gone by, and under such circumstances, it was our lot—(we use the privileged "plural," with your permission, Mr. Editor)—to visit the town of Nottingham, which stands "as a city set upon a hill," with wide and fertile meadows at its base, cut, as it were, into twain, by the waters of the brightly-beaming Trent; and here it was that might be seen, to us, one of the finest sights in the world; for these meadows are covered, in spring time with that beautiful little bulb, the Crocus—the golden colour, of course, prevailing, but exhibiting, also, the blue, the white, the striped, and every other variety pertaining to the species. The meadows belonging, in a considerable degree, to the town—Nottingham possessing no less than 1200 acres of what may be termed commonable ground—the people turn out, a large part of the population, to enjoy and appropriate their own; hundreds upon hundreds, like a numerous flock of sheep newly turned into a fresh and verdant field, gradually extending over the whole expanse; the children, playful as lambs, picking the flowers, putting them into their laps, and carrying them home to deck their dwellings! Can any sight than this be more pleasing? Alas! that it is so rare;

for experience teaches us that our footpaths in the country are blocking up, our steps turned into the narrow lanes, and our free range over the green fields shut out;—property, we speak it sorrowfully and imploringly, gradually isolating and enclosing our *glens*, our hill-tops, and our pleasant meads, until the very ways of our youth are forgotten.

We had well-nigh forgotten the Hanging-Gardens, of which we had proposed to write; but we cannot quit the green banks of Trent without narrating the following anecdote:—Colonel Thornton, of sporting memory, in the days of the old regime, went over to France to visit Chantilly, and there he could not refrain from expressing to its princely possessor his admiration of the verdant beauty of the lawn. "Yes," said his host, "you may well admire it, for it cost a great price, and came from your own country. I imported the turf from the neighbourhood of Nottingham." Along the brow, and down the hill-range on which the town is built, extend the gardens of its inhabitants, which consist of small plots of ground, divided by paths and hedge-rows, and adorned with all the beauty that anxious culture can bestow, having gates and locks to secure the vernal treasure. Happy is the man who obtains possession of one of these paradises, at least for a season. Himself, his wife—if he be so blessed—and his family, may be seen hurrying on, as if bent on mission of highest moment, to commence their early morning task, with some light garden tool in hand, some new plant or flower; while, with a smile, the older and more experienced exclaim, as they pass, "There goes neighbour Tomkins; *they* have caught the garden-fever!" And garden-fever sure enough it is; for they dig and rake, weed and water, plant and transplant—in short, do everything but *wait*, till Nature can do her part to produce the desired result. Not so the more experienced; their passion has cooled, and they have learned wisdom. These know that time is an element of culture; sowing the seed, after many days and careful watching they expect and sweetly enjoy the harvest. Pic-nic and tea-parties are, as it were, the produce of these pleasant places; and in some the substantial summer-house is erected, wherein we have seen a sumptuous dinner served. The view from these green spots is delightful, looking on to the groves of Clifton, hallowed by the muse of Henry Kirke; and, altogether, whether as regards social enjoyment, healthful recreation, or quietude and peace, we have rarely seen a more charming resort than the Hanging-Gardens of Nottingham.

NOTES UPON A FEW PLANTS SUITABLE FOR VASES.

ALTHOUGH it would be difficult to imagine a plant more suitable for vases than the Scarlet Pelargonium, yet as, for the sake of variety, it is necessary to cultivate more than one kind of plant for this purpose, perhaps the following hints may not be without interest to some of our readers.

For early spring blooming, nothing can be more suitable than the Nemophilas, as insignis, maculata, atomaria, and discoidalis. These, if planted in tolerably rich but porous soil in the autumn, will stand through ordinary winters, and their gay, varied flowers, trailing over the surface, and depending round the sides of the vases, have a very gay and interesting appearance. Next to these, Collinsia bicolor and grandiflora are very desirable, the latter especially, as it forms a very gay and compact tuft of flowers; while Leptosiphon densiflorus and androsaceus are not to be despised. For contrast of colour, Sphenogyne speciosa, with its bright orange flowers, is very desirable; it should be sown in September, and be nursed through the winter in a cold frame, in 3-inch pots, in rather poor soil, and the plants be planted thickly in the vases in April, being previously thoroughly hardened. Lupinus nanus, treated in the same way, is also a very beautiful plant; while the lovely little Clintonia pulchella, turned thickly out of pots into the vases, will be found quite a gem. This plant, to grow it well through the winter, requires to be kept rather dry, and should be potted in soil rather rich in vegetable matter, or with some peat, in a rough state, mixed among the soil. Clarkia pulchella and pulchella alba, though rather stronger-growing plants, are very pretty, and will contrast well with some other things, as will also Gilia tricolor and tricolor alba. Godetia rubicunda will be admissable on the same principle, as will also Iberis coronaria and umbellata, Erysimum Peroffskianum, Nolana atriplicifolia, and, though last not least, the lovely little Kaulfussia amelloides. Most of these plants, in ordinary winters, will stand in a sheltered situation in the open borders; but where they are required for vases, it will be best to make sure by keeping them in pots under the shelter of a frame, or a mat or two. Before planting, it will always be necessary to have the plants thoroughly hardened by full exposure, but take care that they are in full growth, and not stunted.

The preceding plants, with white, scarlet, purple, and German stocks, and a few good plants of the double yellow and dark purple Wallflowers, will keep the vases gay until the end of June, at

which time the Fuchsias, Pelargoniums, and usual occupants of the vases, should be hardened and ready to plant out.

Next them, in interest, the following will be found very suitable and gay :—

Silene Schafta.—This simple, but very gay and pretty, herbaceous plant, inhabits rocks on Mount Keridach, in the Russian province of Talysch, and was introduced, through Dr. Fischer, from the Botanic Garden, Dorpat, in 1844.

The following account is from the *Journal of the Horticultural Society* :—"This proves to be a beautiful little herbaceous plant, producing a great number of spreading, slender, downy stems, which form compact tufts, and are terminated, near the extremity, by four or five bright purple flowers, more than an inch long. Of these flowers, that at the extremity of the shoot opens first, and those below it one after the other in succession, so that the branches are, by degrees, covered all over with blossom. Its stems do not rise above six inches high, and render it well suited for bedding out or for cultivating among collections of alpines, or for rockwork, over which it will bend gracefully." The accompanying engraving, representing a well-grown specimen, fully bears out Dr. Lindley's description, and shows the Silene to be a very elegant plant, and suitable for decorative purposes. It strikes very freely by cuttings, under a hand glass, and is also increased by seed, which it produces in great abundance; but being a perennial, the plants do not bloom until the second year. Presuming, however, that you can procure seed, and that it is your wish to grow some specimen plants, sow the seed immediately, and, when large enough, pot them into sixty sized pots, in light porous soil not too rich, putting three plants in each pot. When the plants are established, stop them regularly, so as to make them produce abundance of shoots, and when they have formed a compact tuft, remove them into forty-eight or small thirty-two sized pots, using the same compost as before. Keep them through the winter in a cold frame; but about March pot them into pots of a suitable size, using loam and leaf-mould in about equal proportions, and making it tolerably firm in the pots. After this potting, it will be well to give the plants the protection of a frame; to keep a moist atmosphere, and to encourage the plants to grow as fast, but as robustly, as possible; stop the shoots regularly, and support those in the centre with a few neat stakes, but allow the side branches to droop gracefully round the sides of the pot. Towards June they will begin to blossom, and at that time they may be removed to the vases, and be planted out, and afterwards be regularly supplied with weak manure water. Take care that the plants do not suffer for the want of water; and, to prolong the season of blooming as much as possible, remove the seed pods, which are produced in great abundance, as fast as they appear. After blooming, the plants must be cut in pretty close, and started afresh, or be thrown away to make room for other plants.

Silene Schafta, a specimen plant.

Silene Schafta, the natural size.

Silene laciniata.—Though a much older plant, and very much more difficult to cultivate, this is perhaps the most beautiful of the Silenes. It is a native of Mexico, and was introduced to our gardens in 1823. Requiring the protection of a frame in the winter season, it is generally treated as a greenhouse plant; and, though the flowers will not bear looking at with a florist's eye, being, as their specific name indicates, "ragged," yet, the peculiar bright red, and almost scarlet-colour of the flowers

gives them, upon a well-grown specimen, a very interesting appearance. This plant is very readily propagated by cuttings of the young wood, put in sandy soil, and plunged in a gentle heat. They strike the most readily, when in a growing state, early in spring, but they may also be rooted in the autumn. After the cuttings are rooted pot them, for the sake of getting large plants quickly, three plants into a large 60-sized pot, using a compost consisting of turfy loam, leaf mould, and peat, in about equal proportions, adding sufficient gritty sand to make the whole open and porous. Keep the plants in a moist, growing atmosphere; and, after they are thoroughly established, and progress in growth, stop the side shoots regularly to promote a compact growth. If the cuttings are rooted early, and kept growing vigorously afterwards, being shifted into larger pots as they require it, they will, by June, make plants either for vases or for simple decorative purposes, and will be found exceedingly interesting. As young plants make the best specimens, it is not worth while to keep the old plants except for stock.

Sedum Sieboldii.—How rarely we meet with well-grown specimens of this very interesting plant! Yet, what a very pretty thing it is when properly grown. Our common enemies the snails, however, have great affection for it, devouring it with greediness, unless protected, and hence the reason, in some measure, why it is so little seen. Cultivated as a pot plant, and, more especially, when grown, year after year, into a large specimen, it is a remarkably interesting autumn-blooming plant, remaining in perfection for a considerable time, and having a very graceful appearance. It is a native of Japan, and was first brought into cultivation in 1838. It is propagated freely, either by cuttings, or by division of the plant. The best time to divide them is in the spring, when the plants first begin to grow, and cuttings may be rooted when they are an inch or two long. Supposing you have strong established plants, the best method will be to shift them, about the end of March, using turfy sandy loam, and leaf mould, in about equal proportions, with plenty of gritty sand, and some charcoal broken small. If the plants are strong, give them a liberal shift, say into a pot two sizes larger, disengaging the roots from the sides of the ball at the time of shifting; and, if the plants grow vigorously, they will require a second shift in the course of the season. Keep the plants in a frame, or the greenhouse, and in a situation inaccessible to snails. A little weak liquid manure will be found useful throughout the season, especially when the plants are in full growth. When the flowers begin to show colour, expose them to the full sun, and remove to the vases if the weather is suitable. After blooming cut the old stems away, and keep the plants in a comparatively dormant state through the winter. The old plants should not be reduced in size, but should have the ball reduced every spring, and be kept growing on year after year.—A.

NOTES ON THE CULTIVATION OF SUMMER AND AUTUMN PEAS.

By Mr. P. BENISON, Gardener to John Angerstein, Esq., Woodlands, Blackheath.

FOR the supply of a gentleman's family few things are more in request than good autumn Peas, and yet how rare an occurrence it is to see a good crop late in the season! And why is this? Simply because we do not provide the means of insuring a successful result; but sow them as we do the spring crops, trusting to Providence for a favourable result, but doing comparatively nothing ourselves to promote a successful issue. It is true there are some soils more suitable to Pea cultivation than others, and it is equally well known that a soil suitable for early spring crops, rarely produced good Peas late in the season, and hence upon a soil naturally light, porous, warm, and early, means must be taken to render it as cold as possible to ensure good late crops.

At this place, the garden slopes to the east, and is a poor sandy loam resting on sand or gravel, and though we get fine early crops, a good summer or autumn crop, without considerable preparation and attention, is a matter of great doubt. To remedy this, I make it a rule to manure and trench the Pea ground two or three spades deep, leaving it rough at the surface until the time of sowing. I think I hear some one saying, "What! manure ground for Peas?" Yes, we manure it, and not only that, we prepare for each row of Peas a trench, and manure it as we would for a crop of celery, giving it at the time a good dressing of cow-dung if it can be procured, and if not, five or six inches deep of well-decayed hot-bed dung. For light soils, cow-dung in a fresh state is the best manure, but upon heavy cold soils horse-dung will be found preferable. For early crops we do not find it necessary to make any particular preparation; but later in the season, and for summer crops, without it we should not succeed at all.

Our mode of procedure is as follows:—When the ground becomes vacant it is manured and trenched in the ordinary way, and when the time arrives for sowing the crop, a trench nine inches

deep and fifteen inches wide is taken out, the soil, as the garden slopes considerably, being placed on the lower side of the trench, then a coating of cow-dung six inches thick is forked in and covered a few inches with soil, and upon this the Peas are sown. If it is late in the season, and the weather dry, it is a good plan to soak the seed in water for a day or two before sowing, as it accelerates their vegetating; but for early crops, and when the weather is moist, such a precaution is not necessary. All the secondary crops are sown in this way, and indeed, where a *crop* of Peas is desired, instead of a few dishes very early, we are quite sure this plan should be followed. In the garden of a neighbour we saw last season some rows of Warner's Emperor and the Warwick Pea, which had been sown in highly manured trenches, and instead of being the puny things we generally see them, they were from four to five feet in height, and quite as much through the branches at the top, and yielded bushels of splendid Peas. It is true the produce was a few days later before it was fit to gather than it would have been in poorer soil; but this was amply compensated for by the very superior quality of the produce. On poorer soils, those who sow in enriched trenches for early crops will not regret the experiment; but they must not forget to give more room between the rows than is customary under ordinary circumstances. It was one of the prejudices of by-gone times, that Peas did not require manure, that if they had it they would run all to halm, and the produce be unusually limited; but in these free trade times, when people begin to understand that the soil cannot yield that which it does not contain, the anti-manure doctrine, even for Peas, is fast falling to the ground, and will soon be numbered among the things that were. In the highly manured market gardens of the metropolis, special manuring, except for late crops, may not be necessary; but upon all light soils, and more especially dry soils, a thorough manuring is indispensable to success. Where the ground is rich, and especially where the crops are sown in manured trenches, more room will be required between the rows, especially of the tall growing kinds, but if some of the new Peas turn out as they are represented, it is more than probable that the best of the tall kinds must "go out;" even the Victoria, Knights, and British Queen, must make way for Hairs' Mammoth Marrow, a dwarf pea of prodigious size, fine flavour, and a most abundant bearer. One great advantage of sowing Peas in trenches is, the facility it offers for thoroughly soaking them with water in dry weather, and nothing tends so much to keep the mildew away, as to promote a vigorous growth at all seasons, and to this end we frequently give our Peas, when in full bearing, a thorough soaking of manure-water, or scatter a little guano along the trenches, and then water with plain water. Mulching between the rows with short grass, the refuse of the pleasure ground, is also a good practice, as it prevents the evaporation of the moisture, and keeps the ground cool between the plants. For early crops, Warner's Emperor, and Flanagan's Early, if not the earliest, are the best in quality, and the most profitable. Then follow, Fairbeard's Surprise, and the Champion of England, two early marrow peas of remarkable excellence, alike suitable for early, and very late crops. Of dwarf Peas, Bishop's new Long-podded is first-rate, but not suitable to poor, light soils, and Bedman's Imperial is very profitable. The Scimetar is fast wearing out, a true sample being a difficult thing to be met with; but if, as we have remarked before, Hair's Mammoth Pea proves what it has been represented, it will doubtless become an universal favourite. For the very dwarf kinds, as Bishop's Queen of Dwarfs, Burbidge's Eclipse, and the like, we have no special liking; as, in damp seasons, unless staked, they are liable to rot at the bottom; besides, they are rather too handy for rats, mice, and other vermin, who, under the ample foliage, can devour them in security. Those who grow the preceding Peas may rest assured that they have the best kinds, and though they purchase every kind found in the seedsmen's catalogues, they will not improve upon them.

For a very early crop, a south border should be chosen, and these should be sown in November, and be protected through the winter when necessary. A second crop of the early kinds, should be sown in February, and then a row each of four different kinds, say Knight's Dwarf Marrow, Fairbeard's Champion of England, Hairs' Mammoth Marrow, and Bishop's Long-podded sown every month until August, will give a good succession throughout the season. The four Peas specified above, will come in a few days apart, and hence a succession of young Peas is secured. For the last crop, a warmer border should be provided. One of the best crops of late peas we ever saw, was raised in pots filled with rich manure, planted out upon a south border previously trenched and well manured, and after planting, the whole ground was thoroughly soaked with weak manure-water, and mulched several inches thick with the dung of an old mushroom bed. These Peas were sown in August, and through October they yielded an excellent crop.

Miscellaneous Notices.

HORTICULTURAL SOCIETY.

April 16.—The subjects exhibited, though not numerous, included some of considerable interest. Among the most remarkable of the novelties was a small plant of a New Holland species of Clianthus, which had been received by Messrs. Veitch, of Exeter, under the name of C. formosus. It promises to be a showy plant, having pinnate leaves, with elliptic woolly leaflets, and axillary sub-umbellate heads of flowers on longish peduncles; the flowers are large, rich crimson, with a large black shiny boss at the base of the vexillum. A large silver medal was awarded to it. Another novelty was Pimelea Verschaffeltii, from Mr. Ayres, of Blackheath; this, when well grown in a low greenhouse temperature, proves to be a fine species, having elliptic lance-shaped leaves, and large heads of white blossoms, which are very fragrant in the evening; a certificate was awarded to it. Mr. Errington, gardener to Sir P. Egerton, sent a cut specimen of a curious brownish flowered species of Oncidium. From Mr. Lane, of Berkhampstead, was a plant called Warrea discolor, a dwarf species, with dingy pale sepals and petals, and a dull, deep purple lip. A drawing by M. Warczewitz, by whom the plant was collected, was exhibited, in which, what was stated to be the same plant, growing at a greater elevation—9,000 feet—was represented with the lip of a deep, clear blue, the higher temperature of a lower elevation producing the dull colour, which had also been developed under cultivation. A similar case was mentioned, in the instance of a new Trichopilia, from Costa Rica, exhibited by Mrs. Lawrence, of Ealing Park, of which a drawing by M. Warczewitz, made from a plant growing at a considerable elevation, was also exhibited, and represented it as of a much higher colour than the cultivated plant; which agreed with specimens found by that collector in lower and hotter districts. Mrs. Lawrence also sent a fine Cattleya Skinneri, which, with the Trichopilia, received a Banksian medal; and some other interesting plants, including a beautiful Erica nitida, which obtained a certificate. Messrs. Henderson of St. John's Wood, sent a group of plants containing Ceanothus papillosus, which Dr. Lindley stated, had, so far, proved the most tender of the recently introduced kinds; and with it some other plants, including Epimedium colchicum, a brilliant yellow flowered hardy plant, apparently a form of E. pinnatum, to which a certificate was voted. A certificate was awarded to a seedling Azalea indica called Delecta, from Messrs. Fairbairn of Clapham; it is a clear rosy pink, showy variety, but rather coarse. Messrs. Henderson, of the Pine-apple Nursery, had in addition to the Hyacinths and Cinerarias noted below, a fine dwarf bushy plant of the pretty Siphocampylus manettiæflorus. Mrs. Temple, of Connaught Terrace, sent two vases of flowers modelled in wax. Among the plants from the garden of the Society, was a plant of the double white flowered peach, introduced by the Society from China; it will prove a very pretty plant for forcing, and for the decoration of conservatories, but like all other early-flowering plants, will be liable to be damaged by frosts if left exposed.

As is usual at this season, Messrs. Henderson, of Pine Apple Place, sent a collection of the finer kinds of Hyacinths, but still, many of them very deficient in the properties which constitute a good flower. Among the more remarkable, we noticed *Yellow*, Jacobea single, and La Grandeur and Duc de Berri d'Or, double; *Blue*, Lord Wellington, Globe Terrestre, Blockesburgh, and Alfred the Great; *Red*, Monsieur Fesch, Sans Souci, and Mars, all single, and dark in colour; *Rose*, La Dame du Lac, single; Eendraught, Acteur, Comtesse de la Coste, and Professor Lindley, the latter with a dark eye; *White*, the old favourite Groot Voorst, Lord Wellington, Perreque Royal, Sultan Achmet, and Herman Ange, and of single white, Helene, and Grand Blanche. The same gentlemen also contributed a collection of Cinerarias, among which Cerito, Wellington, and Adela Villiers were the best. A seedling Cineraria, named Madame Sontag, white, tipped with mazarine blue, though small, was very pretty, and will make a good sale plant; and Lettice Arnold, crimson, with a ring of white round the disc, is also desirable. Mr. Henderson, of the Wellington Nursery, had Pauline, a very good puce purple, of passable form.—Of Fruit, Mr. Jones, gardener to Sir John Guest, Bart., sent three Ripley Queen Pines, very fine for the season, one especially so, most beautifully swelled; and Mr. H. Dobree, of Guernsey, sent a model of a remarkably large Chaumontell Pear.

Gromier du Cantal Grape.—At the present day, the Vine is distributed very extensively over the globe, in countries where the mean summer temperature reaches 67 degrees Fahrenheit. The limit to which the culture of the Vine extends in France, forms an oblique line, which, beginning at the coast above Nantes, passes a little beyond Paris, Laissons, and the confluent of the Moselle and the Rhine. Beyond this line the Vine does not ripen its fruit in the open ground, and can only be grown in a Vinery, or, in favoured situations, on espaliers, a method of growing it which is only applicable to some varieties, such as furnish what are called dessert Grapes, (*Raisins de table*). Among the varieties raised from the Vine since its introduction to Europe, and the number of which, according to M. Odart, may be upwards of a thousand, nearly sixty produce very good dessert Grapes. The *Gromier du Cantal* is one of the best quality in this class. Unfortunately, when the northern limits of the Vine are approached, its culture presents considerable difficulty. Even at Paris it is not readily propagated, or transplanted, and must be treated with much skill and care. Notwithstanding this fact, the *Gromier du Cantal* may be almost considered as an exception; for, round Paris, it is found to ripen its fruit, even in the most exposed situation. The bunches are irregular, and measure from ten to twelve inches in breadth, weighing about three pounds. The berry is large, round, and of a rose colour; the skin is thickish and the flesh firm, and very agreeably flavoured.—*Revue Horticole.*

1. *Statice imbricata.*
2. *Cattleya elegans.*
3. *Barkeria melanocaulon.*
4. *Oncidium hæmatochilum.*
5. *Cypripedium Lowii.*

NEW AND RARE PLANTS.

STATICE IMBRICATA, *Webb.* Imbricated Statice. —Nat. Ord., Plumbaginaceæ, § Staticeæ.—A pretty greenhouse perennial, with pinnatifid leaves, cut in the lower part into oblique lobes, becoming smaller downwards, the upper part forming a large entire lobe. The flower stem is two feet high, winged, and terminating in a corymbose head of branches, each corymbosely divided, the ramifications bearing numerous flowers; calyx, rich blue, cup-shaped, crenated persistent; petals, small, cream-coloured, fugitive. — From Teneriffe; introduced about 1847. Flowers in summer.

CATTLEYA ELEGANS, *Morren.* Elegant Cattleya. —Nat. Ord., Orchidaceæ, § Epidendreæ-Læliadæ. —A magnificent stove epiphyte, having club-shaped stems, ovate-lanceolate leaves, and a short raceme of large flowers; the sepals oblong-lanceolate; the petals oblong, undulated, broader, bright rosy pink; the lip three-lobed, furrowed, undulated, the intermediate lobe large, rich dark purple—From Brazil: St. Catherine's; introduced to Belgium about 1847. Flowers? ——

BARKERIA MELANOCAULON, *Richard* and *Galeotti.* Dark-stemmed Barkeria.—Nat. Ord., Orchidaceæ, § Epidendreæ-Læliadæ.—A graceful epiphyte, with a straight stem, ovate-lanceolate, distichous leaves, and flowers in a drooping raceme; they are rosy-lilac and purple, the sepals linear-lanceolate, the petals oval, attenuated, the lip two-lobed.—From Mexico; introduced to Belgium about 1848. Flowers in the summer months.

ONCIDIUM HÆMATOCHILUM, *Lindley.* Purple-lipped oncid.—Nat. Ord., Orchidacaceæ, § Vandeæ-Brassidæ. — Syn: O. luridum purpuratum, *Lindley.*—A very handsome stove epiphyte, bulbless, with thick spotted leaves, and stiff racemes of flowers, the sepals and petals greenish yellow, speckled with purple, the lip rich crimson; one of the most beautiful of the Oncidiums. From New Grenada; introduced before 1847. Flowers in September. Messrs. Loddiges, of Hackney.

CYPRIPEDIUM LOWII, *Lindley.* Lowe's Lady's Slipper.—Nat. Ord., Orchidaceæ, § Cypripedeæ. — A very handsome stove perennial, with strap-shaped leaves. The flowers, sometimes in racemes, sometimes singly, on a downy stem, are large; sepals ovate, downy externally, green, with a purple tinge near the base; petals long, spathulate, curving, greenish yellow, with purple blotches, violet purple at the end, hairy on the margins; lip, pouch-shaped, purplish green, shining.—From Borneo: on trees in thick jungles; introduced in 1846. Flowers in autumn. Mr. Low, of Clapton.

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Conoclinium ianthinum

CONOCLINIUM IANTHINUM.

Nat Order, Compositæ ♀ Eupatorieæ.

Generic Character.—Conoclinium, D. C.—*Capitulum* many-flowered, homogamous. *Involucre* campanulate, scales in two or three series, linear, acute, nearly equal. *Receptacle* naked, conical. *Corolla* tubular, scarcely dilated at the throat, limb five-toothed. *Anthers* included. *Stigmas* cylindrical, obtuse, exserted. *Achænia* angular, glabrous. *Pappus* in a single row, hairy, scabrous.—(*Endlicher, Gen. Plant.*)

Conoclinium ianthinum.—*Morren.*—Violet Conoclinium.—Suffruticose at the base; stem erect, round, articulated, streaked, glabrous, softly pubescent at the summits; leaves opposite, on long stalks, oblong-ovate, wedge-shaped at the base, attenuated at the apex, with coarse teeth, many-nerved, sub-scabrous above, softly pubescent and paler beneath; capitules pedicellate, densely crowded in a terminal corymb, about 30- (or more) flowered; scales of the involucre thirty or more, in two or three rows, elongate-lanceolate, acuminated, velvety on the back; receptacle somewhat hemispherical; achænia angular-streaked, glabrous.

DESCRIPTION.—Half-shrubby below. Stems woody, brown, and streaked with fissures below, articulated, glabrous, and becoming smooth, green, and shining towards the top. Leaves oblong-ovate, wedge-shaped at the base, attenuated above, pointed, coarsely toothed, the upper face deep green, scabrous in the reverse direction, the lower face pale, tomentose, as if velvety, the nerves numerous, projecting below. The flower-heads are arranged in crowded, terminal corymbs; the pedicels velvety and usually five in number, each corymb commonly containing six heads; the scales of the involucre are arranged in three irregular rows, elongated, lanceolate, hairy outside, glabrous within, green, or with a brownish tinge; receptacle somewhat hemispherical, with a few short hairs; corollas light rose, the stigmas very long, of a delicate violet colour, verging toward blue.

This plant was described under the present name by Professor Morren in the *Ghent Annals*, for May, 1849, where he says truly, that the receptacle scarcely warrants its being referred to the genus *Conoclinium* since it is not conical; but as the plant agrees with those of this genus in other respects, he was unwilling to make a new genus on such grounds. In the specimen we have examined the receptacle bears a few hairs of a short and bristly character, so as to approach *Hebeclinium*, but I do not think these sub-divisions of the Eupatorieæ sufficiently absolute to require the alteration of a received name, merely to remove the plant from one to another of these doubtful genera.—A. H.

History, &c.—Our present subject is a native of St. Catherine's, in Brazil, from whence it was introduced to the Belgian gardens, by M. De Voss, a botanical collector, employed by the late M. A. Verschaffelt of Ghent. It appears to have reached our gardens from this source during the past year. The plant which furnished the accompanying figure, was grown in the collection of Messrs. Rollisson of Tooting, to whose obliging courtesy we are indebted for an early opportunity of publishing it. We are also indebted to the Messrs. Henderson of St. John's Wood, for an opportunity of inspecting another flowering example, which bloomed in their nursery, during March of the present spring.

Culture.—This Conoclinium appears to be a plant of very easy cultivation. It will, however, require a cool stove during the winter and the early spring months, and must be grown freely. In the spring, the flowering plants, if removed to a warm greenhouse, will bloom more vigorously, and continue longer in blossom. During summer the plants may be kept in a greenhouse, or perhaps even exposed to the open air in warm sheltered situations; but, on the approach of winter, they must be returned to a cool part of the stove, in which they should have a light and airy place. According to the experience of the Belgian cultivators, it would appear that the plants continue to bloom freely all through the summer. It is probable, however, that their great value will be as decorative objects for the conservatory and drawing-room, in the early spring, when all flowers are valuable, and blue flowers are scarce.

Propagation is readily effected by cuttings of the young shoots planted in the usual way, and kept in a moderate and close heat. The plants when established in separate pots of rich, light, loamy soil, should be frequently topped, and shifted into others of larger size before the roots become crowded in the pots; they should be kept near the glass in a house or frame where they can have a moist atmosphere, with plenty of air, and a temperature of from 60 to 65 degrees. Two-thirds of light free loam, to one-third of good leaf mould, or, in place of it, fibrous peat, incorporated with sand enough to keep the mass open and porous, will form

a compost suitable for the plants at any stage of their growth. No doubt by selecting established cuttings in spring, large plants may be grown by a continuance through the summer of the stopping and shifting processes; and such plants, from the free-flowering habit of the species, will probably be found extremely useful for late autumn and winter flowering in a warm conservatory. Young plants thus managed would also no doubt in any case be found preferable to older cut down plants, in so far as healthy growth and vigorous blossom-heads were concerned.

From memoranda communicated by Mr. Brown, the foreman at Messrs. Rollisson's nursery, we learn that plants growing in sixty-sized pots, will carry a fine head of bloom, and as these may be had in flower in the winter and early spring, they must in that state be especially valuable for the decoration of drawing-rooms or conservatories, or for grouping and massing with other plants in ornamental vases. Probably this is the form in which the species will be found most useful to cultivators, as its ageratum-like appearance will perhaps cause it to be less prized during the summer months. Plants for this purpose should be struck and well-established in their pots early in autumn; and may then be had in succession, by keeping back the principal stock as much as possible in a low temperature, and placing a selection, from time to time in a more exciting atmosphere. From 60 to 70 degrees appears to be the range of temperature suited to the growth of the plants, according to the experience already acquired; and 55 degrees, with a dry atmosphere, would therefore suit them when at rest.—M.

Vegetable Physiology.

By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

CHEMICAL ACTION.

SOME knowledge of the characters of chemical force, and of the mode in which chemical laws act, is indispensable for the comprehension of the phenomena presented in the lives of vegetables. Plants stand midway between the dead mineral world and the active, moving portion of the living world, the animal kingdom, in the great chemical interchange which is constantly taking place between the several portions of the material creation. Both animals and plants are constructed and built up of substances derived from the earth, air, and water; but vegetables alone are capable of receiving these mineral materials into the substance of their structures, and of assimilating them, as it is called—that is, of making use of them as food out of which their existing parts may be repaired and strengthened, and new parts produced. Animals cannot obtain nourishment from any substance which has not previously formed part of a vegetable; and in the vegetable kingdom, therefore we find the most remarkable of those natural phenomena in which the chemical and vital forces act together. The whole vegetable kingdom might indeed be regarded, in an utilitarian point of view, as a great apparatus for the production of *organic* substances, that is, of chemical compounds, differing from all those we can ourselves produce at will in our laboratories, in so far that they can be formed only in the interior of the tissues of living things, by chemical action regulated and directed by the special vital force of the being of which they form part.

In the formation of these compounds within plants, the general chemical laws still hold good, and the chemical action in plants is not different, but only more complex than in the mineral kingdom; this complexity arising from the interference of the new agent, life, in the phenomena. So greatly, however, does this influence the character of the chemical actions, that we find the resulting compound formed from a few of the simple elements, multiplied a thousandfold under its direction; and while in the mineral world we see a certain product always formed when we unite two given substances together, when we place two, ten, or a hundred plants in such a position that they are all deriving the nourishment from the same soil, we find the same set of elements entering into all, but almost every species forming some new and different product from them in one or other part of its tissues; and, moreover, the formation of these products depends almost wholly upon the degree of health or vital power of the plant. Hence the almost innumerable variety of vegetable substances, the oils, acids, alkaloids, &c.: all consisting of almost the same elements, few in number, which, in their free state, when not under the direction of a vital force, are only capable of uniting into a comparatively small number of compounds.

The use of the word element recalls me to the immediate subject of the present paper, namely, a

brief sketch of the nature of chemical phenomena. The business of the chemist is to examine into the peculiar characters of the substances of which the material world is composed; to separate those which he finds to be made up of different constituents, so as to arrive at the elements, the first unalterable materials of which all things are made up; and to seek out and define the laws which regulate the combinations of these elements. In common language the word element has not yet lost a false signification which has remained attached to it since the days when chemistry did not exist. The elements are said to be four, fire, air, earth, and water; and the ancients thought the world was really made of these. All things may, indeed, be still said to exist only in three of these elemental forms, namely, of solids, liquids, and airs or gases, for fire is a result of combination; but this is true only in respect to form, and we are now acquainted with about sixty different substances, which are at present to be considered as elements, since we are unable to decompose them any further. Some of them are solid, others liquid, others gaseous, at the usual temperature of the atmosphere. Among the solids, for instance, are all the metals (except quicksilver), carbon (charcoal), sulphur, iodine, &c.; among the liquids, quicksilver and one of the constituents of sea-water, called bromine; among the gases oxygen and nitrogen, which, in a state of mixture, form the air we breathe; hydrogen, which, when combined with a certain proportion of carbon, forms the common gas used for illumination, &c. Many of these change their form under peculiar circumstances, especially under different degrees of heat; thus, extreme cold will freeze quicksilver into a solid, while a moderate heat converts it into a vapour or heavy gas; sulphur, again, may be melted by heat into a liquid, and by greater heat brought also into the state of vapour.

These elements combine together to form all the other substances, solid, liquid, or gaseous, which exist in or upon the earth. By the word *combine* is here meant, not merely a mixture or conjunction of two elements, but a particular kind of union which it is the especial province of chemistry to explain, and which is called chemical combination. The nature of this may be most easily explained by an example: The air which we breathe is composed of oxygen and nitrogen, two simple elements, and these are merely in a state of mixture, which may be compared to the state of sugar and water, when mixed together to form a syrup, each ingredient still retaining its own essential characters unaltered. Water, on the other hand, is a chemical compound of the two elements, oxygen and hydrogen, two gases, which when thus *combined*, lose their peculiar characters for the time, and form a new substance different from both,—in like manner to the result produced when we pour an acid upon a metal, say nitric acid upon a copper halfpenny: the copper gradually disappears, the acid loses its corrosive acidity, and a beautiful blue liquid is produced as the result, which liquid, if we evaporate it, yields crystals of the nitrate of copper, a substance differing in form, colour, texture, and all other qualities from both its elements. Such *combinations*, and on the contrary *decompositions* or separations of compound substances into their elements, are going on unceasingly around us in every part of the creation.

But these combinations are by no means formed at random; they are subject to most strict and definite laws. Some elements will combine most readily with a certain number of others, not with all, or only under particular circumstances. In the changes which take place, we find the elements exhibiting preferences for particular of the rest, preferences which can even be reduced to a scale of degrees. This preference to unite with particular substances is what is called *affinity;* and an element is said to have the greatest affinity for those others with which it forms the compound most difficult to decompose or separate into these component parts. And these affinities give rise to a wonderful diversity of interchanges, when the various compounds come in contact with each other under various circumstances; for if two compounds, consisting of elements which have but small affinity, meet together, they often exchange, and thereby produce, two new compounds. Thus, for example, if we have a compound of A and B, and another of C and D; and the affinities between A and D, and between B and C, are stronger than those at present binding the elements together; when the two compounds are brought to act upon each other, there will be a double decomposition, as it is called, and two new substances will be formed, one of A and D, the other of B and C, as the result of the interchange. Or, in a simpler case, if we take the compound A and B, and add the element C to it, the affinity between this and B being greater than that between A and B, C will displace A and form a new compound with B, while A is set free. As an example of the first, if we add the solution of nitrate of copper, obtained by dissolving a halfpenny in nitric acid, to a solution of carbonate of soda, since the affinity between nitric acid and soda is greater than that between the carbonic acid and the soda, they will leave their original compounds, and combine to form a nitrate of soda, while the carbonic acid will go to the copper to form a carbonate of copper, which, being insoluble in water, will fall to the bottom as a heavy powder. In the second case, if we add nitric acid alone

to carbonate of soda, nitrate of soda will be formed, and the carbonic acid will be driven off free, in the form of gas, causing an effervescence.

These brief illustrations of chemical affinity, will perhaps suffice to afford some idea of the manner in which chemical changes proceed; there is, however, another important point to be dwelt upon in connection with this part of the subject, namely, the theory of equivalent proportions, or the atomic theory, as it is called.

It is found, that in those combinations and interchanges brought about by the play of chemical affinities, the elementary substances always combine with each other in quantities bearing a certain relative proportion to each other, and that each having its peculiar equivalent, or atomic weight, as it is termed, will only combine with the rest in quantities which are multiples of that number. Thus, in 9 grains of water we shall always find 1 grain of hydrogen, and 8 grains of oxygen; in 18 grains of water, 2 of hydrogen and 16 of oxygen, and so on; moreover, in all other compounds into which either of these elements enter, they are always found to combine in the same quantities; for example, carbonic acid, composed of oxygen and carbon (equivalent 6), will always contain the former in the proportion of 16 parts out of 22 grains, showing that there are 2 equivalents of oxygen united to 1 of carbon; or in ammonia, composed of hydrogen and nitrogen (equivalent 14), we find always 3 parts hydrogen in every 17 grains, showing that ammonia is a combination of 3 equivalents of hydrogen, with 1 of nitrogen; which can be further proved by bringing 4 equivalents or 32 grains of oxygen into combination with 17 grains of ammonia, when we obtain 27 grains of water, containing 3 grains of hydrogen and 24 of oxygen; while the remaining equivalent of oxygen joins the nitrogen to form 22 grains of oxide of nitrogen.

ON THE PRODUCTION OF SUMMER AND WINTER SALADS.

By Mr. H. BAILEY, C. M. H. S., Gardener to G. Harcourt, Esq., Nuneham Park.

MUCH skill and foresight are requisite in this department of the multifarious occupations of a gardener; nor can he who is deficient in this respect be esteemed a master of his business. The day is past for hoarding up knowledge, and it is only by reciprocating it that we can hope to attain to perfection in anything. Let us, therefore, cheerfully communicate those practices which we have found to be advantageous, for the benefit of those who may (*in any particular department* of the art of horticulture) have had less opportunity than ourselves of acquiring knowledge by experience; thus shall the hints contained in this our miscellany contribute to the general good, *one* and *all* deriving benefit from them.

The principal ingredients used in salads are Lettuce, Endive, Chicory, Radishes, Beet-root, Celery, Tarragon, Chervil, Nasturtium, Burnet, Small Salad, and Cucumbers. Upon the culture of each of these, it is proposed to offer a few hints, founded not upon plagiarized directions from old authors, but upon practice and observation.

Lettuces are of two kinds, Cos and Cabbage, and their duration may be extended over the greater part of the year by a little management. The first crop may be got in about the middle of April, and will be most valuable for salad at that period. The kind is called the Dutch forcing Lettuce, which I obtained at Haarlem some years ago. If sown about the 25th of August, and preserved in a cold frame during the winter, it may be planted on a slight hotbed about the end of February; or potted and plunged to the rims of the pots. The greatest difficulty is to preserve the plants from damping. It will bear almost as much heat as a Cucumber, but requires shading in bright sunshine, and a little night air to prevent excessive condensation of moisture. It forms a hard close head, and is, at the season in which it comes in, a luxury but little known in English gardens, although common in Holland.

This crop, those Cos and Cabbage Lettuces which were sown in August to stand the winter *in the open ground*, will succeed in May, and the succession will be continued by sowing a few in a little heat early in spring. To succeed these, a crop sown broadcast in the open ground, and *hoed* out (previously giving a slight dressing of guano), will give fine summer Lettuces; similar successional sowings up to July will continue the supply; but those sown the end of that month, will make fine Lettuces if transplanted in the cooler nights and under the refreshing dews of autumn. If some of this sowing are taken up with balls, and put into a dry house or frame, they will continue the supply till Christmas, or even later.

The culture of Radishes needs little comment; the Early Frame is best for winter and spring use,

and the Turnip rooted kinds for summer. For winter, a frame may be sown the end of September and a fortnight later; and the next sowing may be upon a south border.

Of Beet-root a sowing made the beginning of May in drills will give a supply.

Celery is one of the most important crops; its use for culinary purposes, as well as salads, renders its being of good quality a great desideratum. It is much in request in large families, both for stewing and salads, and forms a most important item of the kitchen garden. The first sowing must be made about the middle of February, in pits in heat, or on a slight hotbed; as soon as the plants are large enough, they should be pricked down upon four inches of rotten dung, laid upon an *impervious* bottom, which causes them to produce a dense mass of fibrous roots when taken up for replanting in trenches. The distance at which Celery is planted, is generally regulated by the ground and convenience; but, like all other vegetables, if it is to be fine it must not be crowded; it requires plenty of water during its growth, and should have a spit of good rotten dung or leaf-mould to grow in. The routine culture is so well known, that it would be superfluous to detail it. The latest crop may be sown about the middle of April; intermediate sowings being also made between it and the first.

Chervil is an annual which only requires successional sowings for winter; some may be sown in pots about the end of July.

Tarragon is much in request by French cooks for flavouring soups and mixing in salads. It increases readily by slips or cuttings. Like the Pentstemon gentianoides, it should never have its tops cut off in winter, but when it has shot a little, in spring, remove them. A store of pots must be provided for winter supply, and gently forced.

Every tyro is familiar with the culture of Small Salad; and that of Cucumbers is so fully before the world in many able treatises, that those who wish for information may consult them.

Endive when well blanched is a most useful winter salad. Successional sowings should be made of it from the middle of June to the middle of August, and in the early part of November a quantity should be taken up and protected in cold frames, or pits. It blanches in a very superior manner if potted and introduced into a Mushroom house.

Chicory should be sown in April or May in drills, and should be six or eight inches apart. The roots may be taken up in the autumn cutting off the tops, and placing them in layers of rather dry soil in a Mushroom shed. It soon produces new leaves, which when well blanched are of a most mild and agreeable flavour.

The flowers of the Nasturtium, and the leaves of the Burnet are sometimes used in salads; and the common Corn salad is an agreeable addition which is much valued in France, where greater attention is paid to salads generally than we give them in this country.

In growing produce of this kind, the judicious gardener will ever have occasion to exercise his mind in the various processes of accelerating, retarding, increasing, or diminishing his supply to meet the demand of the establishment. It is truly said that "there is no rule without exceptions;" and however judicious a course of practice may be for one family, it may ill suit the wants of another.

The great point to attend to in keeping up a supply of any kitchen garden crop, is to make frequent sowings, and to be as frequently planting out small proportions. The aim of a gardener should be to produce a regular and moderate supply, rather than to have an excessive quantity of any one thing at one time.

THE ATMOSPHERE.

By E. J. LOWE, Esq., F.R.A.S.

BEFORE entering into a popular history of the various phenomena belonging to our atmosphere, it is necessary that the reader should be made conversant with the atmosphere itself, in order to be the better prepared to receive information on the respective subjects which it is essential that cultivators of plants should understand.

The atmosphere is a subtle invisible fluid surrounding us on all sides, and is, as it were, an envelope to the earth's surface; without it neither animals nor plants could have any existence; indeed, without an atmosphere, much of the light which we now enjoy would vanish—for, we should only be able to see objects when we faced the sun. On turning our backs to that luminary, all would be darkness, except the feeble light of the stars, which would shine even at noon-day; and those sheltered valleys, in which such numerous tribes of plants delight, would be shrouded in a midnight blackness.

Atmospheric air is a mixture of oxygen and azotic gas, in the proportion of 79 of azote (or nitrogen) to 21 of oxygen, besides which the air contains a very small quantity of ammonia, water in an

invisible state, and one-tenth per hundred of carbonic acid gas, and several local compounds. The proportions of oxygen and azote have never been known to vary. It is the stability of these gases that enables both the animal and vegetable kingdoms to flourish; for an alteration in their proportions would cause universal destruction.

The height of our atmosphere is a question much disputed:—M. Biot conceives it to be 18 miles, Sir John Lubbock scarcely 22½ miles, some extend it to 50, others to 80, and Dr. Dick to 200 miles. The great meteor of February 11, of the present year (whose path was so beautifully traced by James Glaisher, Esq., of the Royal Observatory) when first seen in the north of England, was at a height of 90 miles above the earth's surface, finally bursting in Bedfordshire, at an elevation of 23¼ miles; yet the noise resulting from the explosion was so loud as to be heard at the distance of 100 miles, not only proving that the body was of great size,* but that the atmosphere must have extended beyond this elevation; however, as our atmosphere rapidly decreases in density upwards, our highest clouds floating in an air of only two-thirds the density of that at the sea level, and as vegetation cannot exist in such a rarified medium, it is unnecessary to linger on this subject, which is one likely to be doubtful for some time.

The pressure of the atmosphere is the combined weight of gases, and the elastic force of vapour contained in the air. If the gaseous atmosphere were destroyed, there would yet be an aqueous atmosphere, although life would under these circumstances be extinguished. This atmosphere of water in hot countries would be held in the condition of invisible vapour, consequently those skies would be cloudless; but, as we approached colder regions, clouds would appear, and in the temperate (in which England is included) and polar regions there would be incessant rain or snow. There is one remarkable difference between the gaseous or dry air and vapourous or wet air; the dry air flows from the cold to the warm regions, and the wet air from the warm to the cold. These two atmospheres are well mingled together, and are borne along to great distances; and the latter is only precipitated in the form of rain, hail, or snow, when an atmosphere is entered which is much colder than that which involves them. By calculation we are enabled to separate the weight of dry air from that of moist air; from which we find that with the mean height of the barometer in round numbers at 29½ inches, 29 of this will be dry air, and half an inch wet air.

There are wonderful properties of the atmosphere constantly at work for the benefit of the vegetation of the world, some of which are now to be shown.† The carbonic acid we are exhaling, in a few short hours will be travelling along to the north and to the south of us, endeavouring to traverse the world. The Cedars of Lebanon, the Araucarias of the Andes, and the beautiful Pines of the Himalayas will take of it to increase their size; the Date trees of the valleys of the Nile will drink it in by their leaves; the Cocoa-nuts of Tahiti, and the Mangoes of the Amboyna Islands will ripen upon it; the Ericas of the Cape, the Cacti of the New World, and the Orchidaceous plants of the Indian Archipelago will change it into flowers. The oxygen we are inhaling has been but lately distilled for us by the Magnolias of the Susquehana and the Passifloras of Texas. The huge Rhododendrons of the Himalayas, the Cinnamon trees of Ceylon, and the Roses of Cashmere, with forests older than the Flood, buried deep in the heart of Africa, have contributed to it. The rain we see falling around us was thawed from the mountainous icebergs of the polar seas; and aquatic plants have sucked up from the Nile, the Mississippi, and the Tigris, and exhaled as vapours the mighty snow-fields of the Andes, the Atlas, and the Alps.

* Mr. Glaisher calculates it to be three-quarters of a mile in circumference.

† It is proper to state that the substance of this illustration has been enlarged from some beautiful ideas which appeared in the *Quarterly Review*.

Miscellaneous Notices.

Disease in Pears, &c.—The pistillary necrosis, mentioned in the work which is in the course of translation in the *Gardeners' Chronicle* (January 5th, 1850), is a disease of great importance and interest to the cultivators of Pears, Apricots, Peaches, &c., and also to those who are engaged in making experiments for the producing new varieties. I am not aware that the nature of this disease has been ascertained with reference to these points: the pistil in the flowers of the fruits I have mentioned is very apt to be injured in early seasons by frosts, when the blossom is opened, and even before it is opened: the pistil is not so protected as the male organs, and the shape of the corolla in the Pear will afford less protection to the organs of fructification than is found in the Apricot, Peach, or Cherry; hence the greater uncertainty of the crop of Pears than is the case with the other fruits.

The author of the work I have referred to, ob-

served in early seasons, when there happened to be frosts, that the female organ, even before the flowers had opened, was destroyed or injured, and this whilst the male organs were perfect: and hence the loss of the crop. It has been long since observed, that the flowers of Pears are apt to be injured before opening. This question is important on two grounds: first, as indicating the necessity of early protection of the flower buds; and, next, for the purpose of ascertaining whether, as the shapes of the different varieties of Pears are very different, the quality or hardiness may not in some measure arise from the corolla of some kinds affording a more complete protection to the pistil than others; and if this should be so, these kinds would furnish the most desirable plants from which to attempt to raise new fruitful varieties. I think, with the object of obtaining hardiness, the late Mr. Knight usually selected the Swan's Egg Pear as one of the varieties from which he obtained his seed.—*John Wooley, Cheshunt.*

Reine des Belges Strawberry.—M. Lorio, (of Ghent) sowed, in 1847, seeds of the British Queen Strawberry, and raised about two thousand plants, among which he obtained this new variety, which is distinguished by its vigorous habit and large fruit. The petioles measure from six to eight inches long; they are strong and hairy. The leaf measures from four to five inches long, and from three to four inches across, having numerous large, hairy, and sharply pointed teeth, which are ciliated at the edges; the form of the leaflets is oval, the nerves strong, deep green above, and pale below. The peduncle is erect, and from five to six inches long to the point of division; each division of the cyme is trichotomous, and the fruit is largest on the central pedicel; the pedicels are velvety. The flowers are large, the petals undulated, round; the calyx very large at the fruit, which is large also. The largest we have seen, measured, on an average, two inches in diameter, and about the same in length. It is a poppy red, the achænia are orange coloured, deeply sunk, and growing thickly together. The flesh is vinous and perfumed, of a very delicious flavour. We do not know any Strawberry which will rival this, except the *Caroline*, raised about two years ago by M. Canoy, of Malines. These two are analogous. The *Queen of the Belgians* excels the British Queen by being more productive, and equal in colouring; the latter being generally green on one side, and red on the other. To Market Gardeners the British Queen is not so valuable, as the fruit does not keep so long. The Queen of the Belgians, if cut in the evening, will keep fresh and fragrant for a considerable time, and being, besides, earlier by eight days than the other, is better suited for general cultivation.—*Ann. de Gand.*, v. 257.

Mode of Drying Plants.—The specimens intended for preservation, after having been kept in a press for a few hours, are placed in an apparatus called the Coquette, in which they are exposed to the sun, or placed in a stove, or in an oven. The coquette consists of two open covers, between which the paper containing the plants is pressed by straps or other means. The best kind of covers are pieces of strong iron wire network fastened into frames made of light iron rod. These open frames allow the moisture to escape freely, while boards, or milled boards, absorb and retain it. The name coquette was given to this contrivance, partly on account of the beauty of the specimens prepared with it, and partly in remembrance of its inventor, M. Lecoq, Professor of Natural History at Clermont-Ferrand, (*Journ. de Pharm. et de Chim*). A pair of frames of this kind, with plenty of Bentall's paper, leave nothing to be desired.—*Bot. Gazette*, ii. 55. [The same result is obtained by using wooden frames formed of laths secured together by cross bars so as to leave small vacancies between the laths].

Geant de Basele Pear.—Some years ago the Countess Vilain received from the Marchioness de Trazegnies, a young Pear tree, which was planted at the Chateau of Basèle, situated between Tamise and Anvers, on the river Escaut. This tree bore in 1848 forty Pears, the average weight of which was nearly three pounds. We think the size of the fruit renders the name given to it very appropriate. The largest Bon Chretien d'Hiver cited by Du Hamel, Noisette, Jacques, Lindley, &c., measure six inches in length, by four in diameter, and these dimensions are very remarkable. But the Geant de Basèle Pears measured on an average, fully eight inches in length, and five inches in diameter. The fruit is generally pyriform; some have considerable resemblance to a calabash. The part near the crown is considerably swollen, but without angles or furrows; there is only some appearance of broad pimples, which are confined to the upper part of the fruit. The eye is not placed, as in the Bon Chretien d'Hiver, very deep, but rather rests on a broad and flat surface. The portion towards the stalk diminishes about a third of the breadth; it is round, and obliquely turned near the stalk, which measures something less than an inch, proportionably thick; rather fleshy at the extremity, next the fruit, and inserted in a deep cavity. The skin is thin, greenish, on the side exposed to the sun tinged with rose and purplish colour. All the surface is freely marked with small brown dots, of which some are scarcely visible, while others are large and distinct. The flesh is soft and melting, having a gritty zone near the centre. The juice is mild and sugary, slightly perfumed, but not very abundant, so that this Géant de Basèle is likely to become a good cooking Pear. It ripens (in Belgium) about January. The white colour of the flesh becomes nearly red by exposure to the air. It keeps good till the spring. The confections and marmalade which are prepared from it are excellent, very agreable to the palate, with all the flavour common to the best Pears which are used for this purpose. The tree is a good bearer, and is trained to espaliers. It is of a very vigorous habit.—*Ann. de Gand.*, v. 95.

Climatology.—In comparing two distant portions of the earth's surface with each other, in both of which the same plant is extensively distributed, we are not hence to conclude that the zone which it occupies has in both countries the same *average annual temperature.* Were this the case, such discrepances as the following would be inexplicable. On Mount Etna the beech, the Birch, and the Scotch Fir are said to occupy the same zone. In the Pyrenees, the Beech ceases before the

Scotch Fir begins; and in the Alps the Birch is said to fail even below the Spruce Fir. But in Lapland, the Birch extends far above the Scotch Fir, and, in fact, ascends higher on the mountains than any other tree. Assuming the correctness of these observations (which for Laplaud and the Alps cannot be questioned) we are bound to conclude that there are peculiarities of constitution in certain species, which enable them to ascend proportionally higher in one latitude than another. In other words, an *Alpine* flora is not necessarily an *Arctic* flora in its character. Hence the saying of Linnæus, "Plantæ diversæ indicant altitudinem perpendicularem terræ," must be regarded, not as an *axiom*, but as a *problem*, the complete solution of which still remains to be effected. It is well known that some plants will bear *forcing*, that is, will survive and flourish under constant excitement and irritation, much better than others; hence, we could hardly expect any plant which will not bear some degree of forcing, to thrive in the rapid summer with its long days, and proportionally meridional heat of countries bordering on the Arctic circle, should it even subsist through the rigorous winter of that region.—*Spruce, in Trans. Bot. Soc. Edin.*, iii. 118.

NEW AND RARE PLANTS.

Griffinia liboniana, *De Jonghe.* Libon's Griffinia (*Journ. Hort. Soc.*, v. 137).—Nat. Ord., Amaryllidaceæ § Amarylleæ.—A distinct-looking bulbous stove plant, with narrow oblong flaccid leaves, mottled with pallid blotches on a dark green ground. The flowers are small, ultramarine, with very narrow segments, whitish on the lower half, and having short declinate stamens; they grow on a scape six inches high,—From Brazil: introduced in 1848 by M. De Jonghe, of Brussels. Flowers in spring. Horticultural Society.

Linum grandiflorum, *Desfontaines.* Large flowered Flax (*Revue Horticole* ii., 404).—Nat. Ord., Linaceæ.—A very pretty dwarf glaucous annual plant, of erect branching habit; the lower leaves are small, closely placed, narrow obtuse; the upper ones ovate, acute, or acuminate, delicately fringed. The flowers are numerous, more than an inch across, crimson, with five whitish spaces in the eye. It is said to flower in succession, and to be showy for flower borders.—From Algiers; introduced to the French gardens in 1847. Flowers from July to October.

Æschynanthus javanicus, *Hooker.* Java Blush-wort (*Bot. Mag.* t., 4503).—Nat. Ord., Gesneraceæ § Cyrtandreæ.—A very beautiful and compact growing, soft-stemmed, stove shrub; the round succulent stems throwing out roots from beneath the petioles. The leaves are opposite, ovate, somewhat fleshy, with a few obscure angular teeth. The flowers are numerous, in terminal corymbs, the calyx ample, downy, with a cylindrical tube, and spreading limb, the corolla large, with a slender funnel-shaped, downy tube, compressed sideways, bright red, the mouth oblique, the limb of four nearly equal spreading ovate lobes streaked and blotched with yellow.—From Java; introduced in 1848. Flowers in summer. Messrs. Rollisson, of Tooting.

Warrea candida, *Lindley.* White-flowered Warrea (*Paxt. Fl. Gard.* i., 32).—Nat. Ord., Orchidaceæ § Vandeæ-Maxillaridæ.—Syn: Huntleya candida, *of gardens.*—A rather pretty stove epiphyte, dwarf, with the habit of Huntleya. The leaves are broadly ligulate, recurved at the point. The flowers grow three together, as in the Huntleyas; they are pure white, the centre of the lip purple, towards the edge blue-violet, at the base white streaked with red; the sepals and petals oval acute, the lip somewhat four cornered, the apex retuse, the base saccate and angular.—From Bahia; introduced to Paris in 1848. Flowers in February.

Acanthophippium javanicum, *Blume.* Javanese Acanthophippium (*Bot. Mag.* t., 4492).—Nat. Ord., Orchidaceæ § Vandeæ-Cryptochilidæ.—A handsome and very curious terrestrial stove perennial of the Orchidaceous race, having elongated, cylindrical, jointed pseudo-bulbs, which, when young, are surmounted by two or three ovate-lanceolate, thin plaited leaves. The scape issues from the base of the pseudo-bulbs, and is six or eight inches high, thick, and bearing many bracts. The

showy flowers, six or eight in number, grow singly from within as many of the uppermost bracts; their colour is yellow, tinged and streaked with purplish rose; the sepals and petals are triangular-ovate, and by their arrangement form a pitcher-shaped flower, which is extremely gibbous at the base, on the under side and quite encloses the lip.—From Java; woods on the mountain Salak; introduced in 1844. Flowers in summer.

Penstemon azureus.

PENTSTEMON AZUREUS.

Nat. Order, Scrophulariaceæ.

Generic Character.—Pentstemon, *L'Herit.*—*Corolla* ventricose-tubulose, upper lip of the limb sometimes concave at the base and two-lobed at the summit, sometimes two-parted to the base, more rarely elongated and emarginate; inferior lip patent, three-fid, bearded or naked at the base within. *Fertile stamens*, declinate at the base within, adscendent at the apex; *anthers* variable; *filament* of the fifth stamen sterile, subulate, often dilated, bearded or naked at the apex, as long as the rest, or scarcely half as long. *Style* capitate-stigmatose at the apex. *Capsule* septicidally two-valved, valves entire or bifid; *seeds* numerous, not margined, sometimes ovoid-subtriquetrous, incurved, sometimes truncate at the apex with acute angles.—(*Bentham D. C. Prod.*)

Pentstemon Azureus.—*Bentham*,—Azure-flowered Pentstemon.—Suffruticose; branches and leaves minutely tubercular, with crystalline papillæ; leaves linear-lanceolate, entire, sessile, tapering to the base, somewhat clasping, upper ones narrower; flowers numerous, in a long raceme; peduncles short, crowded in the axils of the floral leaves; corolla contracted and tubular at the base, campanulate above; upper lip scarcely two-lobed, emarginate, lobes of the lower lip broad, emarginate.

DESCRIPTION.—A half-shrubby species, growing one and a half to two feet high; branches twiggy, terete, of a reddish brown colour, somewhat glaucous from the presence of crystalline tubercles or papillæ. Leaves opposite, sessile, somewhat clasping the stem, two and a half inches long, linear-lanceolate, entire, obtuse, broadest above the middle, with a long tapering stalk-like base, shining green, minutely tubercular on both faces, the margins fringed with minute glandular papillæ, especially in the lower part. Flowers very numerous on a long leafy spiked raceme; the pedicels short, crowded in the axils of linear floral leaves, forming 3- to 6-flowered false whorls. Corolla contracted below, suddenly expanding into a bell shape; the upper lip reflexed, scarcely two-lobed, emarginate; the lower deeply three-lobed, the lobes broad, obtuse, and emarginate; tube pink at the base, passing into deep rose at the point where it expands into the delicate purplish blue campanulate portion; limb deep azure blue within.—A. H.

History.—For an opportunity of figuring this very beautiful plant we are indebted to Mr. E. G. Henderson, of the Wellington Nursery, St. John's Wood, in whose grounds it flowered in the autumn of last year. This Pentstemon is a native of the Sacramento Mountains in California, and was brought to the Horticultural Society by Mr. Hartweg, in June 1848. At page 144 vol. v. of the *Journal of the Horticultural Society* Dr. Lindley thus speaks of it:—"This hardy perennial is stated by Mr. Bentham to have been gathered in the dry river beds of the Sacramento. Hartweg wrote on his seed papers that it was a mountain plant. It is very handsome as a border flower, but, as its narrow foliage is not good, it is best grown among other species, such as Pelargoniums, &c." So far as we have been able to judge, the plant has very good foliage, and under proper management will make an excellent bedding plant.

Culture.—Like most of the Pentstemons this species is a very free-growing plant, and its beautiful blue flowers plentifully produced in long spikes entitles it to be classed among the very best. It is readily propagated by cuttings of the young wood either in the spring or autumn. If cuttings are taken in the spring the plants for a few weeks previously should be placed in a gentle moist heat, so as to promote new growth and get the wood quite tender, and then if the cuttings are taken off when about an inch long, and planted in light sandy soil, and the pots afterwards are plunged in a close frame with a gentle bottom heat they will strike root with great freedom. After the cuttings are rooted pot them off singly in rich soil, and when they are established in the pots, inure them gradually to the open air. Stop them if necessary to make them branch, and plant in the open borders in April. Plants rooted in the autumn should be kept through the winter in a cold frame. In dry sheltered situations no doubt it will prove quite hardy, but it is liable to suffer from damp. Planted thickly in rich soil, and pegged down twice or thrice in the early part of the season this Pentstemon will doubtless make a fine blue bed for the autumn, and for the herbaceous borders it is certainly a first-rate plant. When left to themselves, and planted in rich soil, the plants will generally attain a height of from two to three feet.—A.

THE CULTIVATION OF MOSSES.

By Mr. G. LAWSON, F.B.S. Assistant Curator to the Botanical Society of Edinburgh.

"What forests tall of tiniest moss
Clothe every little stone!
What pigmy oaks their foliage toss
O'er pigmy valleys lone!
With shade o'er shade, from ledge to ledge,
Ambitious of the sky,
They feather o'er the steepest edge
Of mountains mushroom high."

AMONG the numerous and varied vegetable forms with which this gay world of ours is so gaudily adorned, there is one tribe for which we have long had an especial liking; it is the Mosses. True indeed, they have no bright array of brilliant blossoms to delight the eye; no majesty of form wherewith to give character to the landscape; no delicious balmy odour to breathe on the soft breeze at balmy eventide! The heedless passer-by might never think that these humble unassuming things were worthy of a lingering look; never would it occur to him that in their humility they exhibited some of the most beautiful and remarkable forms and structures of the vegetable kingdom. But to the inquiring naturalist these tiny fairy plants are replete with interest, and a bank,

"With bright green mosses clad,"

is often one of the most pleasing and refreshing sights which greets the eye of the weary botanist in his lonely wanderings by stream and mountain side. Well indeed can *he* sympathise with the feelings which arose in the mind of the African traveller, when, forlorn and in dark despair, the little Moss in the desert cheered his prostrate spirits, lit up the last spark of hope in his troubled breast, and pointed his Christian eye to Heaven.*

Long however as the Mosses have been regarded with deep interest by the botanist, it is only recently that they have been thought worthy of introduction to our gardens, and still their cultivation is exceedingly circumscribed. We are not indeed very sure that they will ever be extensively cultivated, for they are not the kind of plants likely to *take* with the bulk of horticulturalists, and we are certainly not so sanguine on the subject as some Moss growers have expressed themselves, who anticipate their general introduction to our gardens. Although a neatly kept collection of Mosses in pots forms a very interesting, and withal a very pleasing object, it is one which has few attractions for the lover of the gay and beautiful; the little plants are indeed. one and all of them, passing lovely when closely examined; but it is only now and then that a fortunate tuft can be grown to have any thing like a conspicuous appearance. It is the botanist alone, he who loves to investigate the wonders of the microscopic world, and to find beauty worthy of our most profound admiration, where no one else would dream a trace of beauty could be found; it is he alone who will feel sufficient interest in the

"Dim world of weeping mosses,"

to induce him to persevere in their culture to any extent. Even he will rather prefer, when opportunity occurs, to admire the "green mossy stones" where Nature's own hand has placed them, by the burn-side and the roaring waterfall, than to behold the nursling Mosses of a greenhouse stage, or even the few favourites which he cherishes on the sill of his window. With every lover of these plants, however, their cultivation will be deemed of great importance, as enabling him at all times, in sunshine and in shower, to have the beautiful objects of his regard beneath his very eye in all the vigour and freshness which they exhibit in their native homes on the mountain summit; and more especially will

*Mr. J. Scrymgour, speaking of the Mungo Park Moss (Fissidens bryoides) has some beautiful remarks, connecting it with the traveller, which we are tempted to quote. He says:—"When you see a little rill stealing slowly through a shady wood, between shaggy banks, turn up the grass on the sunniest side, you will be sure to find it there, for such are its favourite haunts. Small indeed, but it, too, has its purpose:

"A flower is not a flower alone;"

and the wisdom of God is as manifest in its structure and growth as in the proud giants of the wood. Art cannot match this tiny thing; all this minute mechanism within and without, growing in every part; its life and power of reproduction baffles the skill of man. Science may describe, but, like a puzzled child, wonders how such things can be. "It is the Lord's doings, and it is marvellous in our eyes." It was a little tuft of this Moss which arrested the eye of Mungo Park, the celebrated traveller, when he was naked, hungry, despairing, and alone, far far from home, in an African desert, and awakened in his heart a strong sense of the presence of a good and guardian God. He was certain that He who would perfect and nourish such a very little plant, and in such a sequestered part of the world would not surely desert a creature formed after His own image. He reasoned well. He rose up, strong in faith, and soon found food, friendship, and shelter. It is impossible to trust God in vain."

a domesticated collection be prized by those museologists who, either for want of opportunity or inclination, pursue their studies by the fireside in the cold days of winter, instead of going abroad at that season of Cryptogamic delights, to seek the

"Mosses cool and wet"

that adorn the craggy steeps with their everlasting verdure.

Nor should we lose sight of the more important advantages likely to be offered by the cultivation of Mosses in another point of view. By carefully watching the evolution of the various organs of particular individuals throughout the entire period of their existence, many important facts may be brought to light tending to elucidate some of the obscure points of Muscological science, and calculated in an especial manner to give us more accurate views of these plants, and much new information concerning their general history, structure, and habits. Were the attention of cultivators specially directed to the subject, we doubt not but some experience of the conditions best adapted for the development of the various species would soon enable them to bring into a fructifying condition some of those mosses whose fruit is scarcely ever found at the native stations, although the barren plants occur in profusion. Bryum alpinum is an instance of this, and so is B. roseum; but perhaps a better example than either will be found in the case of Dicranum glaucum, which, although its large cushion-like clumps occur in the greatest abundance in every highland bog, few botanists indeed have ever gathered in a state of fructification.

The investigations of botanists into the history of Mosses have never been pursued with a view to the cultivation of these curious little plants, and thus the Moss grower will find great difficulty in gaining much special information respecting the species that may be successfully cultivated, as well as in regard to the particular treatment which the different kinds require, for although they form a tribe of plants peculiar to themselves in their structure and habits, and differ widely from every other tribe with which the cultivator has to do, they nevertheless exhibit a great diversity among themselves in the choice of situations for their growth, and in their general habits, all of which must be taken into consideration to insure their successful cultivation.

The raising of Mosses from *spores* (analagous to *seeds* in the higher plants) will always be attended with difficulties, and is an operation that requires the exercise of more care and attention than may reasonably be expected from the generality of cultivators; and although the inquirer into the physiology and structure of the Musci may often adopt this method of raising them, in order to study closely the development of the plant, and the successive formation of its various organs, certain it is that this mode of propagation will never be of much practical service. The cultivator need not send his list to the Seedsman; he must seek the Mosses he wants in the sunny and shady spots of verdant loveliness, where Flora's liberal hand has scattered them so freely; and there he will find abundance of well grown plants fit for his purpose.

In cultivating Mosses the object should be to imitate as nearly as possible those conditions under which particular species is observed to flourish best in its natural habitats. Various species of Grimmia and Andræa, as well as many others with which the ardent collector will soon become acquainted, seek their homes on the face of the bare and bleak rock, themselves and the grey lichens the only traces of vegetation there. The Fontinalis antipyretica—the fire-proof Moss of the Swedes, and the various species of the genus Sphagnum &c, luxuriate in the watery element, preferring the still pools and sluggish streams of the peat bogs or the margins of highland lakes; while Hypnum ruseifolium covers with its deep green verdure the moist stones and rocks amid the continual dashing of the waterfall; and a host of other not less lovely forms are nursed by the spray that rises from these falling waters. The greater number of the numerous family of Hypnum creeping along in the shady corners of rocky places, and in the woods form the "mossy carpet," which has so delighted our Nature-loving poets. Many of the Brya likewise affect such situations, and B. roseum, B. ligulatum and some others well suited for cultivation delight in the cool and shady recesses of the woods where they enjoy a perpetual immunity from heat and drought in the continually humid atmosphere peculiar to such situations. The Funaria hygrometrica, Encalypta vulgaris, Tortula muralis, and Bryum argenteum, are "more akin to human things," and take up their abodes beside or on the walls and roofs of our dwellings. Provision must therefore be made for securing all these varied conditions in order successfully to cultivate a good collection of Mosses. It should however be kept in view that they will all succeed well in, and indeed require, a shady situation, and may be grown somewhat after the manner of Alpines, observing the precaution in all cases to give them large sized pots, whereby the highly injurious effects of heat and drought may be the more readily guarded against.

In proceeding to make a collection, a difficulty will at once strike the beginner as to how he is to

remove those kinds that grow attached to the rock. In such cases the portion of rock should when practicable be detached bearing the tuft, and it may then be potted in the usual manner, making the upper part of the rock level with, or slightly above the surface of the soil. However the intelligent and persevering gardener at Arniston, near Edinburgh, Mr. R. Veitch (who has upwards of 100 species of Mosses in cultivation) employs another mode of transplanting, the success of which is amply shown by his numerous progeny of healthy and vigorous plants. He thus describes his system (*North British Agriculturist and Journal of Horticulture* i. 42):—"For Grimmia pulvinata and Orthotrichum anomalum, I use a soft porous stone the size of the pot, filling it with drainage to such a height that the stone, when resting upon it, is level with the brim. The patches are then placed upon the stone with a little space between each, and, for the purpose of keeping them steady, I sprinkle a little fine mould into the open spaces. I then water them over head with a fine rose. For Mosses of this description little water is necessary; and it ought never to be applied until the leaves begin to collapse, and even then with a sparing hand. They should then be placed in a cool shady situation, and in six or eight weeks they will be attached to the stones. The mould having being first removed by means of a gentle run of water, the pots are then placed in a more airy and exposed situation." Mr. Veitch has a somewhat similar mode of transferring those species of a trailing habit from their native banks to the flower pot. Speaking of these, he says:—"All varieties which partake of the same trailing habit as Hypnum prælongum, should not be planted but laid upon the mould; three or four small pegs will prevent them from being moved. In the course of a few weeks, the pegs will be covered with a mass of green foliage." It has always been our own practice to remove these, and, indeed, all the species with balls of earth attached, and some of them will, indeed, not remove without this precaution, especially those that are minute and readily injured.

The aquatic species will, of course, require to be grown in water, in the way Pilularia and other small aquatics are frequently seen under cultivation; and special attention must be paid to them in order that they may not lack water at any time, or in any season, for it injures their appearance and checks their growth to allow them to get dried up, although they will revive again at any time on the application of moisture. Even the specimens from *herbaria* many years old have been brought into life by this means.

The great majority of the species may, however, be grown in soil, or soil mixed with stones. When practicable the soil should be taken from the spot where the plant was found growing, as, in the absence of a better guide, this will be a very safe mode of proceeding, and the artificial mould prepared for fine varieties of florists' flowers will, indeed, have but a small chance of success in the growing of Mosses. A clayey retentive soil, mixed with well decomposed leaf mould, will perhaps be found the most useful. To this sand may be added for some particular species which prefer it, such as Bryum trichodes and Weissia nigrita.

It is Mr. Veitch's practice to remove all his Mosses in the autumn to the back stage of a span-roofed greenhouse, which forms their winter quarters; but we need not mention that, being native plants this protection is not essential for their well-being. During winter, however, they should always have the protection of a cold frame, with matting during very hard frost or frosty winds, because such of them as have their native habitats in the woods receive great protection from the overhanging boughs and surrounding herbage, the want of which should be compensated for when they are under artificial treatment.

The generality of the conspicuous Mosses desirable for cultivation are perennials, and when once established in their pots, will continue in health and vigour for a long period. Many interesting species, however, are annuals, and a difficulty thus stands in the way of their culture, as young plants must be sought for and carefully transplanted every season, unless, indeed, the cultivator succeeds in raising them from spores. We have ourselves grown the little Diphyscium foliosum successfully, transplanted from its native mountain in its early state; and we have seen the still rarer and not less curious Buxbaumia aphylla, cultivated in a similar manner.

In these necessarily imperfect remarks, we have endeavoured to excite an interest among our gardening friends, in this truly interesting tribe of plants; not, indeed, by any high colouring of their merits, but by a plain representation of what may be expected from them in an horticultural point of view, accompanied by such general hints on their cultivation as have occurred to us. We may at a future time explain the habits and characteristics of those species which, from their superior elegance or interest, seem most desirable for garden growth.

THE CULTURE OF THE GENUS BOSSLÆA.

THE Bossiæas are a family of leguminous plants, chiefly from Australia and Swan River, some of them remarkable for a singularly elegant habit of growth, and the whole of them for the very profuse manner in which their flowers are produced. Unfortunately most of them produce flowers are nearly the same colour, and hence they are not so much cultivated in collections as they otherwise would be; but some of the species being remarkably distinct in foliage and habit, and forming, when properly grown, very elegant specimens, are worthy of considerably more attention than they are receiving at the present time. Their cultivation is very simple; the secret of producing fine specimens, being that of laying a good foundation, for without that it will be impossible to produce a fine plant. To this end, procure, when purchasing plants, the strongest you can meet with in the nurseries. When we say the strongest, we do not mean plants twelve or eighteen inches in height with a few branches, but short bushy fellows; and if the collar, or part of the plant just above the soil is as thick as your finger, and the plant is healthy, and the roots vigorous, you may make sure you have a good plant. It may be remarked *en passant* that the preceding criterion of a good plant, may be taken as a safe guide in purchasing plants of all kinds, more especially hard-wooded plants, for if they are dwarf and healthy, and have, moreover, strong stems, you may make sure that whether they be large or small, they have been well propagated, and well cared for afterwards.

BOSSLÆA TENUICAULIS.

Having procured such, take some good fibrous turfy peat; such as those who understand plant growing procure from Wimbledon Common, and after removing the inert soil, or sand, as it is sometimes called, from the bottom, and the coarse vegetable matter from the upper surface, break it into small pieces, and then pass every part through a half-inch sieve; to four parts of this, add one of nice mellow, fibrous, turfy loam, two of gritty sand, and one of charcoal and potsherds, broken to the size of hazel nuts; mix these intimately together, and then they are ready for use. Next procure some clean porous 6- or 8-inch pots, and drain them thoroughly. If the plants are such as we have advised you to purchase, place the strongest in the largest pots, and the weak ones in the 6-inch size, taking care to *fit* the soil nicely about the roots, and to make it tolerably firm; indeed, if the compost is dry you may make it as firm as you can, without resorting to the ramming process of our forefathers.

The plants should then be placed in a pit or frame where they can be kept tolerably warm and moist, shading them in mid-day until they begin to grow, and taking care to syringe them and shut them up early every sunny afternoon. Thus treated, they will progress very rapidly, and some of them will probably require a second shift towards September. If a frame or pit cannot be spared to place them in, make the nearest approximation you can to the conditions required, to promote free growth in the greenhouse, by keeping a part of it close; or place the plants in a vinery, or other forcing house, where the temperature is not too high, and where plenty of air can be admitted in favourable weather. It will be necessary to curb redundant growth by timely stopping the strongest shoots, to make them branch, but in the cultivation of Bossiæas, unless a branch takes a decided lead, nothing will be gained by stopping it, as they generally, at least the majority of the kinds produce secondary or lateral shoots in tolerable abundance.

When they are first potted it will be necessary to water the plants with caution, but after they get into free growth, and are well rooted, a good soaking occasionally with *weak* liquid manure, such as is produced by steeping a bushel of sheep's dung in a hogshead of soft water, to which a peck of soot and a quart of guano may be added, will be of considerable service. This, diluted with an equal quantity of clear water, will be found excellent for plants of all kinds, providing its use is guided by a practical eye, and too much is not given at one time. As a general rule, if the soil is good, liquid manure should never be used until the pots are tolerably well filled with roots, and under no circumstances to a plant that is in delicate health. To expect to invigorate a sickly plant by giving it liquid manure, would be as wise as to expect to sober an intoxicated man by administering alcoholic drinks; therefore recollect in plant cultivation, over-feeding is worse than under-feeding, for you may keep a plant alive on *short commons*, but once gorge the system, and a plethoric habit is induced, and all healthy action is at an end. We make these remarks thus plainly, not only as applicable to this tribe of plants, but to all plants, and to all cultivation, therefore inexperienced persons will act wisely to make a note of it for their future guidance. All the plants belonging to this genus are very subject to the attacks of the red spider, so it will be well to look them over occasionally, and after syringing, if they are affected, dust them over with sulphur, and let it remain for a few days, when it may be washed off again.

Bossiæas may be propagated by cuttings of the half-ripened wood, but, as they produce seeds very readily, it is seldom necessary to increase them by cuttings, The seed should be sown directly it is ripe in July, and the plants be nursed in small pots through the winter.

In the second year, the established plants may be grown, after they have bloomed, in the open air, taking the same precautions as before directed as to insects, &c., and potting them when necessary.

The following are distinct and pretty species: the engraving represents B. tenuicaulis:—

B. cordifolia.—A dwarf-spreading shrub, with terete villous branches, and cordate-acute, nearly sessile leaves. The yellow flowers are marked at the base of the standard with a purple circle, and have a dark purple keel. New Holland. Introduced 1824. Flowers in April and May.

B. disticha.—A dwarf shrub, rather erect in habit, with slender branches, and two-ranked ovate-obtuse leaves. The flowers are showy, on stalks longer than the leaves; the standard is pale yellow, with a spot of deeper yellow at the base, and bordered with red—the wings stained with red at the base. Flowers from April to October. Swan River. Introduced 1838. A variety of this is grown in gardens under the name of *B. disticha plumosa*.

B. ensata.—A singular-looking upright species, with compressed linear leafless branches, toothed along the edges, and bearing the flowers from the notches. The flowers are yellow; the base and back of the standard brownish orange purple; the keel brownish purple. Flowers from May to July. New Holland. Introduced in 1825.

B. linophylla.—A small, slender, erect-growing shrub, with compressed branches, bearing linear leaves with the edges recurved. The flowers are yellow, the standard veined at the base with red, and the wings and keel marked with the same colour. Flowers from May to September. New Holland. Introduced in 1803.

B. rhombifolia.—A small spreading shrub, with the branches terete, and the branchlets compressed, bearing rhomboidal-orbicular leaves, somewhat emarginate and mucronate. The flowers are yellow: the standard with a zonate red mark at the base, the base of the wings red, and the keel brownish purple. Flowers from April to June. New Holland. Introduced in 1822.

B. tenuicaulis.—A pretty twiggy shrub, with round, slender, straggling branches, and sub-sessile ovate-subacute mucronulate leaves. The flowers are yellow; the standard marked with a zonate blotch of red at the base, the wings streaked with red, the keel dark red. Flowers in April and May. Van Dieman's Land. Introduced in 1836.

SHOW DAHLIAS OF 1850.

By Mr. G. GLENNY, F.H.S.

WEYNES' *Magnificent*, a singularly novel colour, which has been variously described as a lakey purple, rosy purple, purple crimson, &c. A dark amethyst colour is the nearest. Fine outline, good symmetrical face, neat regular cup and full size, quite the best of the new flowers of the year. —*Sir Frederick Bathurst*, a flower after the style of the Standard of perfection, but larger, and every way better. Both this and the former have been figured very much to their disadvantage.—*Snow-*

Flake, a white, which promises more than any recently raised flower to redeem this class. It is a bold flower, with most of the points of average quality, and one or two greatly improved; the centre is high and compact, without any sign of a doubtful development.—*Queen of Primroses.* This flower stands as high as any in the Primrose class; but to us there is a want of fine texture in the petals, without which there is a papery character, which always looks poor. It has every appearance of being constant, and, for a Primrose, it may perhaps stand first.—*Gaiety* is one of those singular varieties that we never saw other than coarse; a deep yellow or orange ground, and speckled with red, which, when pretty dense towards the edges, justifies the name; it is, in fact, a showy, but somewhat coarse flower.

Barnes's *George Glenny.* The single bloom of this, shown at Birmingham, was a round, firm and compact flower, symmetrical, nicely cupped, with a good globular face, fair centre, and a fine yellow; size full average, and great depth.—*Snowball* is, as its name implies, white; the points generally average good; but, except that it is one of the candidates to beat Antagonist, and compete with Snowflake, it is not all we could wish. It was not shown in such good condition as it should have been, and therefore under a disadvantage, and there is no doubt of others doing more justice to it. —*William Bragg* is a neat, small, compact, dark crimson flower, below the average size.

Turner's *Mrs. Seldon*, a flower shown in high condition at Birmingham, where there were six blooms, all compact, well made, cupped, symmetrical; specimens with good average centres, round face, and well up.—*Queen of the Isles.* A light flower, but little known, but threatening to displace all the present varieties, and take the head of the edged and tipped class. Those who have seen it, and people whom we esteem as judges, aver that we have nothing so good.—*Thames' Bank Hero*, a compact dark crimson; full size, but not exhibiting any great novelty.—*Seraph*, a showy orange requiring great care and good growing; an average flower.—*Duke of Cambridge*, silvery lilac rose; good outline, rather coarse, constant-looking useful variety.—*Queen of Lilacs*, a flower of the same class: noble size, fine outline, but rather flat.—*Purity*, a very beautiful white, if it could be depended on; but, as Mr. Turner gives it away to his customers, it may be well to mention that it is on the ground of uncertainty only.

Leggs' *Premier*, a dark purple, with an excellent centre, well up to the surface, and all the other good points in a limited degree—it has the great merit of constancy and prolific bloom, and will doubtless be in most stands.—*Beauty Supreme*, a very singular flower, almost of a ranunculus form, so close are the petals. The symmetrical cupping and largeness of the petals entitles it to particular notice, size under average.—*Crimson Perfection*, a full-faced high-crowned flower, of good average quality, most of the points are possessed in a respectable degree, if none are perfect.—*Miss Newman*, a light variety, which may be useful, but except that good flowers in that class are very scarce, it would not rank very high. It appears to us rather too open for a general favourite. *Juliet*, a middling yellow; not exhibited well grown; but in some hands likely to be useful.

Hansard's *Earl of Clarendon*, a bright large orange colour, very showy; but, although constant up to a certain point, wanting that symmetry which gives the real value to a flower; it has been shown plentifully all the season.

Bragg's *Golden Drop*, a new yellow, said to be the finest colour yet produced, and possessing, in moderation, all the desirable points of a good Dahlia.

Edwards' *Magnificent*, a useful rich purple, but not sufficiently shown to be appreciated, and withall, a badly chosen name, because Keynes' flower, under that title, has been seen by everybody.—*Champion*, deep crimson, and useful, without any advancing points, or faults.

Harrison's *Goldfinder*, yellow; a flower calculated to show off a stand, if caught in perfection, without any remarkable excellencies.—*Mrs. Edward Gennys*, cream ground, tipped or laced with rosy crimson, curious, and unique. *Safrano*, canary, shaded with dark saffron, curious if not very beautiful.

Whale's *Mrs. T. P. Williams*, white, with deep lilac edge; very pretty, but about the make of other light flowers of the class.—*Amabile*, lemon, or sulphur colour; an average flower, perhaps better than some of its class.

FANCY VARIETIES.

Procter's *Elizabeth*, new in colour, (amethyst and white,) beautiful in shape, and hard in the eye; but, when got in good order, quite first among fancies.

Bragg's *Lady Grenville*, Keynes' *Flying Dutchman*, and *Highland Chief*, all scarlet and white—improvements on many of that class.—Whale's *Floral Beauty* is purple and white. Besides, all these which we have seen, and are advances, we have annexed Turner's *Mrs Labouchere* and *Unique*, Barnes' *Lady Cullum*, *Eleet*, and *Picturata*, Salter's *Admiration*, *Clarrissima*, *Reine de jour*, and *Rowena*, and Harrison's *Zenobia*, all said to be superior to the present fancy flowers.

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NEW AND RARE PLANTS.

Tropæolum Deckerianum, *Moritz.* M. Decker's Indian Cress. (*Karsten's Auswahl Gewachse Venezuelas*, t. 12.)—Nat. Ord., Tropæolaceæ § Tropæoleæ.—A climbing cool stove or greenhouse perennial, of free growth, remarkable for the singular intermixture of colour in the flowers. The plant is fibrous-rooted, with somewhat compressed, downy, climbing and rooting stems, bearing peltate triangular-ovate leaves, with the margins sinuated, and attached by hairy petioles. The flowers grow from the axils on long spirally-twisted peduncles; the calyx is hairy, green, and lengthened behind into a straight spur two inches long, which is red, tipped with green; the corolla consists of five unequal wedge-shaped, deeply-toothed, intensely blue petals, within which stand the stamens bearing blue anthers. The plant is said to be less ornamental than the foreign figures represent it to be; but probably like all the other free growing Tropæolums, it requires starving rather than feeding in order to develope its beauty. It is said to grow out of doors in summer.—From Venezuela; introduced in 1849. Flowers in summer. Messrs. Henderson, St. John's Wood.

Dipladenia atropurpurea, *De Candolle.* Dark purple Echites. (*Paxton's Mag. Bot.*, ix. 199.)—Nat. Ord., Apocynaceæ § Wrighteæ.—Syn., Echites atropurpureus, *Lindley.*—A very handsome stove climber, of slender growth, with opposite leaves of an elliptic form, and blossoms growing two or more together on the long axillary peduncles. The tube of the flowers is nearly two inches in length, expanding about half way from the base, into a wide throat, with a spreading limb an inch and a half across; the colour is a dark dull brownish purple, and the flowers in the earlier stages of their development have a pleasant odour.—From Brazil; introduced in 1841. Flowers in summer. Messrs. Veitch of Exeter.

Oncidium cosymbephorum, *Morren.* Rosette Oncid. (*Ann. de Gand*, v., 275.)—Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—A pretty stove epiphyte, with broadly oblong acute rigid leaves, attenuated below, and springing from the base of the plant. The flower scapes also issue from the base of the plant, and bear a many-flowered panicle; the sepals and petals are conformable, ovate, obtuse, undulated; the lip with short uncinate lateral lobes, the intermediate lobe emarginate, plain and entire, with a rosette-like crest of tubercles at its base. The flowers are prettily coloured; the sepals and petals bright rose, spotted with crimson purple, and tipped with yellow; the lip cinnamon brown; the tubercular callosities at its base yellow and purple.—Native country not known: introduced to Belgian gardens about 1848. Flowers in August.

1. *Tropæolum Deckerianum.*
2. *Dipladenia atropurpurea.*
3. *Oncidium cosymbephorum.*

C.S.R. del. & lith.

Printed by C. Hullmandel

VRIESIA SPECIOSA.

Nat. Order, Bromeliaceæ.

Generic Character.—Vriesia, *Lindley*. *Sepals* three, involute equal, shorter (always?) than the petals, revolute at the apex. *Scales* two to each petal, semi-adnate, undivided. *Stamens* exserted; three free inserted at the base of the petals, three inserted between the petals, and connate with their bases, anthers linear, smooth, extrorse. *Ovary* half-inferior, conical; stigma three-lobbed, lobes convolute and sinuate, villose. Leaves flat (or canaliculate), erect. Flowers distichous, distant, bracts large, canaliculate, coloured.—(*Lindley Bot. Reg.*, 1843).

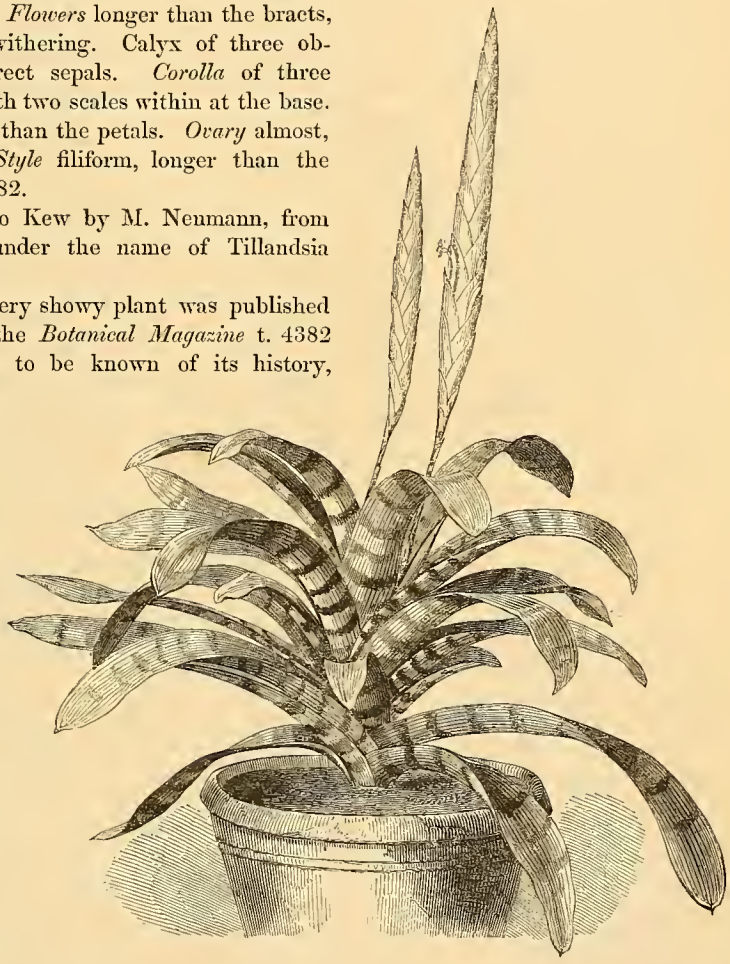
Vriesia speciosa, *Hooker*. Showy Vriesia.—Leaves broadly oblong, obtuse, with a mucro, canaliculate, quite entire, glabrous, naked, black-banded; scape scaly, spotted with black; spike elongated, scarlet, coloured; bracts lanceolate, acuminate, closely imbricated, conduplicate-keeled, one-flowered; flowers white, exceeding the bracts.

Synonymy.—V. speciosa, Hooker in *Bot. Mag.* t. 4382. Tillandsia splendens, Hort. Paris.

DESCRIPTION.—Leaves radical, a span or more long, lorate oblong, canaliculate, or almost semi-cylindrical, very concave at the base, the margin entire, the apex inflexed, blunt, but tipped with a mucro, colour dark green, with black transverse bands. *Scape* arising from the centre of the leaves, a foot and a-half long (including the spike), terete, scaly, green, with black spots; this is terminated by a compact spike of lanceolate, acuminate, complicate-compressed, carinated, closely imbricated *bracts*, each including a single white *flower*. *Flowers* longer than the bracts, cylindrical, curved, soon withering. Calyx of three oblong, scarious, obtuse, erect sepals. *Corolla* of three linear-spathulate *petals*, with two scales within at the base. *Stamens* six, rather longer than the petals. *Ovary* almost, if not quite superior. *Style* filiform, longer than the stamens.—*Bot. Mag.* t. 4382.

This plant was sent to Kew by M. Neumann, from the Jardin des Plants, under the name of Tillandsia splendens.—A. H.

History, &c.—This very showy plant was published by Sir W. J. Hooker in the *Botanical Magazine* t. 4382 (1848). Nothing appears to be known of its history, except that it was introduced to English gardens from those of the continent. The figure was prepared from a fine example communicated in March 1850 by Messrs. Lucombe, Pince & Co. of the Exeter Nursery. The entire plant is represented in the accompanying vignette. It is as yet rare in collections, though eminently deserving of extensive cultivation. Though the flowers themselves are ephemaral, yet the plant continues for a long time exceedingly ornamental, the most showy part, the spike of richly coloured bracts, being very enduring. Gradually the bright scarlet of the lower bracts become duller, and eventually greenish, and at last this colour extends over the whole spike.



Culture.—The culture of this species is the same as that of Æchmea discolor, given at p. 121.—M.

PROFESSIONAL AND MORAL TRAINING.

HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey," &c.

I NOW intend to give you a summary of the advantages a gardener derives from a knowledge of geography and drawing. Plants are found in all countries, and as collectors are now more than ever employed, both by Horticultural Societies and by gentlemen who are anxious to enrich their native country with the beauties of the vegetable creation, it is incumbent upon us to keep pace with the daily increasing desire to improve the cultivation of plants; and for that purpose it is necessary for us to understand something of the locality in which each plant is found.

By geography we may know the general climate of the country; how it is influenced by regular or variable winds, by heats or colds of various degrees. We must expect the more particular account to be given by the collectors who see each specimen growing in its native locality, influenced by its situation on hills, in valleys or plains, or in the neighbourhood of rivers or of mountains, and in marshy or upland soil. Many peculiarities of that nature, the locality of every plant will afford to the inquisitive eye of the collector, who should be capable of investigating the influences by which each species is surrounded. But in the absence of this particular information, which it is so necessary for us to receive, we must be guided in our cultivation by the general description of the country that we may obtain by geography. There are many travellers in distant lands, who frequently supply their friends at home with the curious plants that they find worthy of notice. By such persons no particular information is given as a clue to their successful cultivation, and we are left to be guided by our own knowledge of the country, how to manage them; and in accordance with our knowledge or ignorance of the geography of that country will generally be our good or ill success in their management.

There is a general knowledge of the climate and soil of every country to be obtained by a knowledge of geography. It also affords us pleasure and profit to know something of the countries whence our most delicious fruits have been introduced into this favoured land. The more you cultivate acquaintance with horticulture, the more you will see the many advantages to be obtained from a knowledge of the geographical distribution of plants. Then, everything tending to explain the phenomena of each locality, will be received as a hint useful for the better cultivation of any fruit tree or plant introduced from that part. It would be advisable for you to devote some time to the study of geography, and at all favourable opportunities to converse with persons who could give you some information on the subject. From men who have travelled through different and distant lands, a great deal of useful information is to be derived; they are generally pleased in giving a description of their travels, and by asking questions tending to draw out an explanation of the nature of the soil, climate, &c., some instructions may be received. The more you really know of any country the less liable you are to be imposed upon by what are called "travellers' tales."

I must advise you that it is the best plan to study one particular subject for some time, until you attain a general knowledge of it, when another branch of study may be added as a relaxation from more laborious mental employment. Variety is pleasing in natural and artificial landscape scenery, and is equally pleasing to the mind when the study of one subject is blended with another, so that the transition is easy to form the whole routine of improvement.

Drawing may be considered as an amusement, it may be cultivated at all favourable opportunities, and will contribute much to the advancement of a gardener in his profession. In all the departments of knowledge success will invariably attend a persevering industry, on which a man will fix the whole strength of his understanding. The rudiments of drawing you will find explained in a small but excellent treatise on drawing, written by John Clark, and published by Messrs. Chambers. It will give you instructions how to proceed with method; the rules laid down will explain the plan on which you are to proceed. Follow them closely and attentively, and everything will appear plain and simple; but without a method to guide you, you cannot work advantageously either in the garden or on paper.

In the course of your practice you will very likely be required to give plans for horticultural buildings that it may be intended to erect under your instructions. A knowledge of the principles of that art is necessary to derive improvement from the many structures so usefully and economically employed in various gardens in this country. In laying out flower-gardens or pleasure-grounds, I have first drawn the plans as correctly as I could on paper, then I have covered a large door, or any other large board fit for the purpose, with any stiff soil worked into the consistence of paste, like the earth used for grafting trees. The soil is spread over carefully, and all the parts of the plan are copied from

the paper to the board. By this method a working model is formed, in which the irregularities, if any are to be made on the surface, can be plainly shown; and the walks, clumps, beds, and all the different parts can be distinguished. Taste in the execution may be displayed by the use of a little brown sand to represent the walks, any small branches of trees stuck in to form the clumps, a few flowers for the beds, and moss to represent the grass.

CULTURE OF THE ERICA.

By Mr. JOSEPH FAIRBAIRN, Nurseries, Clapham.

IN my last paper upon the Erica, I treated upon the criteria for the selection of the proper soile, and preparation of the same; the selection of the most suitable kind of plants to grow on for specimens; and some general remarks, by way of guidance, in shifting or repotting. As the present is a very suitable and proper period to proceed with the operation of shifting, I will proceed to give a list of the best kinds to select for spring, summer, and autumnal flowering:—

Spring-flowering Heaths.

Aristata.
„ major.
Andromedæflora.
Arbuscula.
Floribunda.
Grandinosa.
Hiemalis.
Lambertiana rosea.
Linnæana.
Linnæoides.
Neillii.
Sindryana.
Rubra-calyx.
Sanguinea.
Sparsa.
Templeæ.
Tenella.
Transparens nova.
Vernix.
„ coccinea.
Westcottii.
Willmoreana.
Smithiana.
Ovata.
Persoluta rubra.
Regerminans.

Summer-flowering (June to August) Heaths.

Aitoniana.
„ turgida.
Ampullacea major.
„ rubra.
„ elegans.
Bandoneana.
Beaumontiæ.
Bergiana.
Cavendishiana.
Cerinthoides.
„ stricta.
Clowesiana.
Denticulata moschata.
Depressa.
„ floribunda.
Elegans.
Eassoniana.
Eximia.
Fastigiata lutescens.
Ferruginea.
Favoides elegans.
Florida.
„ campanulata.
Hartnellii.
„ nana.
Humeana.
Inflata.
„ rubra.
Infundibuliformis.
Irbyana.
Jasminiflora alba.
Jasminoides.
Jacksonii.
Lawrenceana.
M'Nabiana.
Massoni.
Metulæflora.
„ bicolor.
Mirabilis.
Mundula.
Mutabilis.
Murrayana.
Obbata.
Parmentieri rosea.
Perspicua nana.
Propendens.
Retorta.
„ major.
Shannoniana.
Splendens.
Sprengelii.
Tortiliflora.
Tricolor.
„ Dunbariana.
„ elegans.
„ Wilsoni.
Tricolor Wilsoni superba.
„ „ coronata.
Vasæflora.
Ventricosa.
„ coccinea.
„ „ minor.
„ Bothwelliana.
„ grandiflora.
„ splendens.
„ hirsuta rosea.
„ alba tincta.
Vernoni superba.
Vestita alba.
„ „ grandiflora.
„ coccinea.
„ rosea.
Webbiana.
Westphalingia.

Autumn and Winter-flowering Heaths.

Archeriana.
Banksiana purpurea.
Colorans.
„ superba.
„ blanda.
Exsurgens.
„ coccinea.
Incarnata.
Bowieana.
Longipedunculata.
Mammosa.
„ major.
Nitida.
Picta.
Princeps.
Princeps carnea.
Pyramidalis.
Sanguinea.
Taxifolia.
Vernix ovata.
Verticillata major.
Vestita alba var.
Sebana lutea.
„ rubra.
Gracilis.
„ cernua.
Rubens.
Carniula.
Ollula.

From the foregoing sections, whether for exhibition or for general culture, varieties may be selected, that will furnish flowering plants for the whole year.

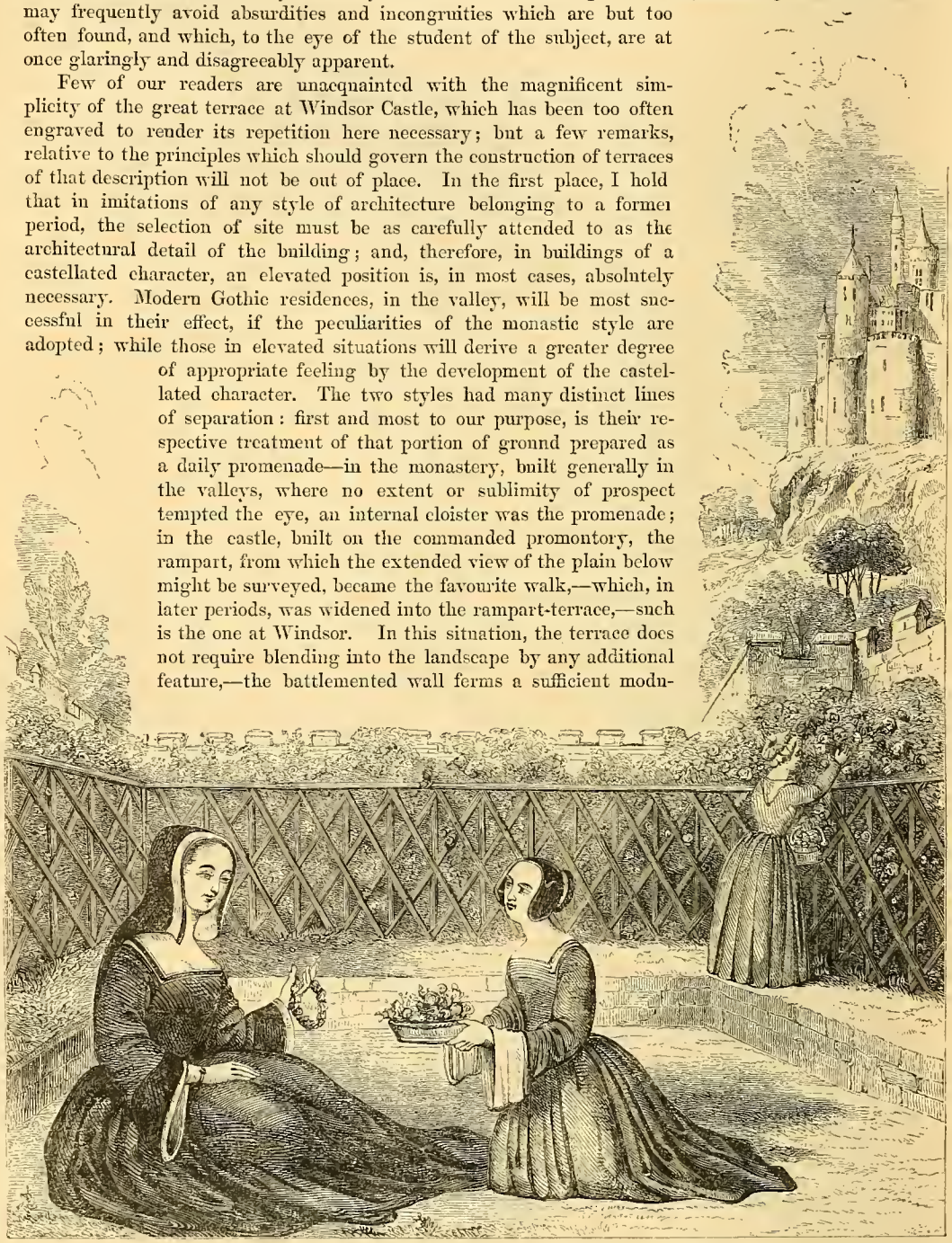
Heaths like plenty of air; it must be given freely, but carefully; as, from exposure to the dry arid cutting winds, plants that are growing freely are apt to get a rustiness that will so disfigure them, that months will elapse before they are free from it. If the plants are in pits or frames, it is well to open the lights on the contrary side to the wind, which will effectually prevent the rust of cutting wind, and thus shelter the plants; at the same time that it is quite efficient for the purposes of ventilation. With respect to the plants grown in the Heathery or other houses, it will be well, during the continuance of cold winds, to close the doors to the eastward, and admit air but sparingly from the front sashes, taking care to let down the top lights so as to insure a free circulation of air. When the plants are in full growth, and the weather is of a parching character, it will be necessary to look them over every day, and water freely, taking care that none may be allowed to suffer for want of it, which, at this stage, would prove destructive of the flowering of the plant, if not of its life.

NOTES ON DECORATIVE GARDENING.—Style of Terraces of Different Periods.

By H. NOEL HUMPHREYS, Esq.

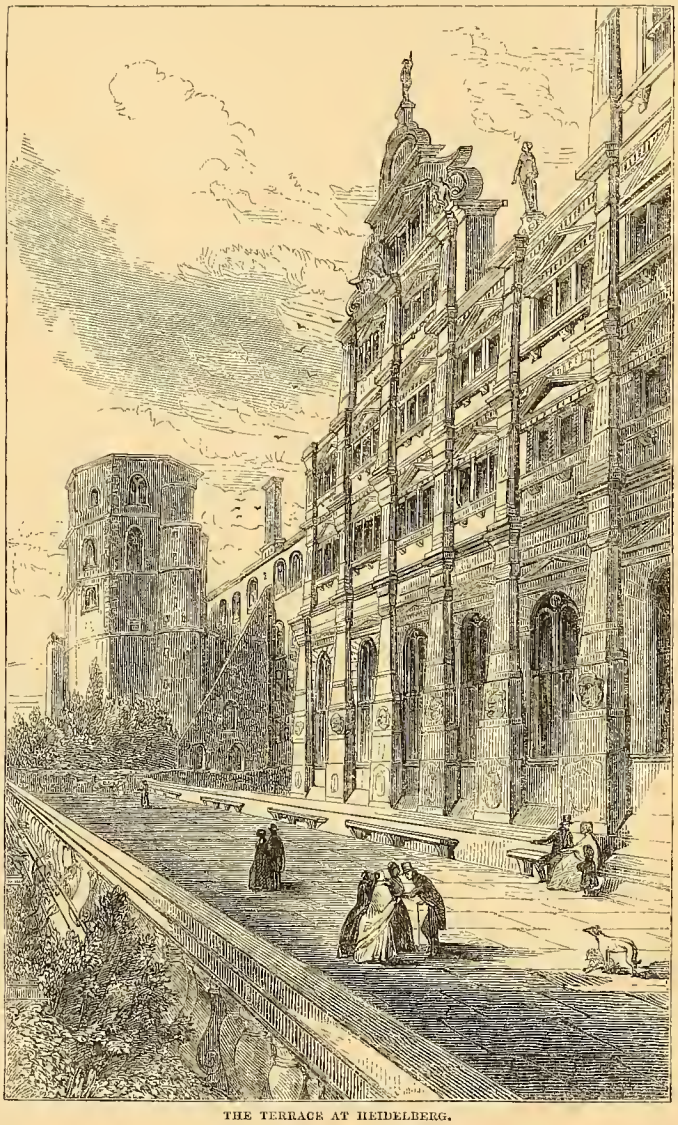
THE consideration of the style and character of the TERRACE, at distinct and distant epochs, is not without interest; and, by the study of this—the historical part of the question, garden architects may frequently avoid absurdities and incongruities which are but too often found, and which, to the eye of the student of the subject, are at once glaringly and disagreeably apparent.

Few of our readers are unacquainted with the magnificent simplicity of the great terrace at Windsor Castle, which has been too often engraved to render its repetition here necessary; but a few remarks, relative to the principles which should govern the construction of terraces of that description will not be out of place. In the first place, I hold that in imitations of any style of architecture belonging to a former period, the selection of site must be as carefully attended to as the architectural detail of the building; and, therefore, in buildings of a castellated character, an elevated position is, in most cases, absolutely necessary. Modern Gothic residences, in the valley, will be most successful in their effect, if the peculiarities of the monastic style are adopted; while those in elevated situations will derive a greater degree of appropriate feeling by the development of the castellated character. The two styles had many distinct lines of separation: first and most to our purpose, is their respective treatment of that portion of ground prepared as a daily promenade—in the monastery, built generally in the valleys, where no extent or sublimity of prospect tempted the eye, an internal cloister was the promenade; in the castle, built on the commanded promontory, the rampart, from which the extended view of the plain below might be surveyed, became the favourite walk,—which, in later periods, was widened into the rampart-terrace,—such is the one at Windsor. In this situation, the terrace does not require blending into the landscape by any additional feature,—the battlemented wall forms a sufficient modn-



GARDEN SCENE FROM THE ILLUMINATED PRAYER-BOOK OF ANNE OF BRITTANY.

lation from the castellated features of the residence,—and the park scenery beyond approaches, with natural and excellent effect, to the very base of the rampart wall; and this severity of treatment is absolutely necessary to terraces of this description, on which all attempts at the introduction of statuary, roses, &c., would be utter failures, the only suitable ornament being a simple line of flower border next the building, within a broad edge of turf. The more gardenesque features of the castle must develop themselves in a less conspicuous situation in the rear of the building; and where wood or walls will shield them, and prevent them from weakening the severity of the main composition. It will be instructive to step back to the period of castellated strongholds, and see how their builders and indwellers managed these matters in their own day. A magnificent pictorial border, from the calendar of the prayer-book of Anne of Brittany, one of the finest illuminated MS.S. in existence, will furnish us with an example; it represents a rosery, enclosed by a battlemented wall partially screened by trees, much below the elevation of the castle. The Chatelaine is represented visiting her castle-garden in one of the sunny days of April, where in some parts of France, Roses are already in bloom, and she is in the act of receiving from her attendants chaplets and garlands of flowers, which are no doubt destined to decorate chalices and vases of cunning goldsmiths' work in her Gothic boudoir. This cotemporary garden picture, executed about the year 1499, contains many suggestions for garden features in similar situations, though not perhaps for too servile imitation. In the illumination, the palisades enclosing the rose-trees are gilt.



THE TERRACE AT HEIDELBERG.

Let us now consider the castle terrace in its later form, when the severe character of the defensive stronghold had been modified by additional buildings of a later period engrafted upon them—the decorative mansion, like the change in a "dissolving view," emerging from among the towers of the defensive castle. Of this transition period, the terrace at Heidelberg, which, with the castle, forms one of the finest ruins in Europe, is a beautiful example. The embattled parapet of the ancient rampart has given place to an open balustrade, and the stone seats suggest, that, in the palmy days of this grand-ducal residence of the House of Baden, orange trees and other plants, in ornamental vases, mingled with statuary, to give this noble terrace its finishing touch of palatial grandeur—forming a rich foreground to the magnificent view of the course of the Necker, which is the grand feature of the prospect

from the terrace at Heidelberg. The introduction of any more trivial features, or of decorative features beyond the terrace, would destroy the proper character of a terrace of this description, which must still preserve a portion of the severity belonging to the castellated period.

Of decorative gardens of a strictly palatial character, where no remains of the castellated style are visible, those of Italy are the finest models, and among the finest specimens of these, taking into consideration the position, are those occupying sites among the beautiful rocky slopes of the Appenines, in the vicinity of Tivoli and Frascati, the noble and regular terraces of which, tier above tier, in contrast with the rugged yet lovely scenery which surrounds them, form the finest combination of outline imaginable.

From the days of Horace, and his description of his "Sabine farm," those beautiful hills have been the favourite retreat of the Romans; and the style of decorative gardening which surrounds the palaces of the nobles of modern Rome is, doubtless, very similar to that cultivated by the ancients. This is, in fact, proved by the representations of suburban villas in fragments of antique frescoe and mosaic, while the description which Pliny gives of his garden might serve for that of one of the modern villas at Tivoli. The finest of these villas were erected during the fifteenth and sixteenth centuries, and as the feeling of Italian art spread rapidly northward during this period, the terraces, statues, and fountains of these noble residences became the models on which the decorative gardens of the North of Europe were formed; those of Boboli and D'Este being the ideals from which Le Brun and others produced the magnificent wonders of Versailles.

The villa D'Este beneath Tivoli, though its terraces are crumbling to ruin, and its fountains are dry, is yet one of the most wonderful of these great creations of art. It was among its mazes of marble and matted foliage that Tasso once mused away the soft and sudden twilight of the evenings of an Italian summer, and from the fairy picture with which he was surrounded painted, in immortal poetry, the fairy gardens of the palace of Armida; and, in all the freshness of their beauty, ere Time had touched "with his defacing finger" the spotless marble, or dried the sources of the countless fountains, or thinned the parquets of their exotic flowers, he might in vain have sought a more fitting model when he was composing the lines which may be thus freely translated:—

With aspect sweet the smiling garden spreads
Where waters softly sleep, or gush in crystal founts;
Flowers and sweet herbs form rich enamelled beds;
Vales of deep shade there are, and sunny mounts,
And round the lawns a wood its freshness sheds;
And that which yet increased each charm revealed
Was, *that the art that wrought it lay concealed.*

Which is to say, that true art must not be obtrusive; the effects produced must not suggest the idea of painful and laborious operation; it is the perception of the beautiful that must be the first impression, and not that of the art by which it has been produced. This will depend much upon whether the beauty attempted to be created be of a *temporary* or a *permanent* nature—whether, as Sir Uvedale Price observes—whether it be merely adapted to the accidental prejudices prevalent in the artist's own day, or whether its principles be so founded upon the uniform constitution of the human mind as must command the approbation of ANY age. This great principle of all high art applies, continues Sir Uvedale Price, to nothing more strongly than decorative gardening.

ON THE SPRING DECORATION OF FLOWER BEDS.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

WHAT a minute attention to matters, which, taken in detail, may be called trifling, constitutes the perfection of gardening as a whole, in the most unlimited acceptation of the term, must be considered as a self-evident truth by every one at all conversant with the proposition; and, however grand and comprehensive may be the effects produced by the application of taste, those effects are traceable to the attention which has been paid to the several materials by which they are produced. There are few who enter a well-furnished and well-arranged conservatory who are aware of the vast amount of anxious care and attention to little things which has been exercised before the splendour which they there behold has been produced; and these cares and anxieties cannot be generalized: nearly every plant before them requires a peculiar treatment, and though standing before their eyes

redolent with health and beauty, has probably been the subject of anxious care for many months previous. Now, these remarks are equally applicable to the flower garden, and have been made with a view of drawing attention to a much-neglected subject, the details of which, from the simple (I may add, common) nature of the materials operated upon, may be termed trifling, yet contain sufficient elements for the production of a great amount of beauty, and consequent gratification, and that, too, at a season when their beauty is well appreciated—I mean, the decoration of flower beds during March, April, and May.

It must be admitted, that, if a method can be pointed out by which the barren and desolate appearance of empty flower beds can be relieved during the above period, it is, at all events, a very desirable thing; and as I feel well convinced that it is attainable by a very small amount of labour, I will make no apology for offering a succinct detail of the culture of the plants I would bring forward as specially applicable for that purpose; and as the season is at hand when their culture must be attended to, there cannot be a better time to bring the subject forward.

It is necessary to observe, that there must be a space of ground set apart for the cultivation of a portion of these plants, which, for the convenience of planting, cleaning, and watering, should be divided into beds; if it be shaded from the mid-day heat, so much the better; but I would rather it were fully exposed than wholly shaded, as the sun is a necessary agent in the production of a flowering habit.

First and foremost, both as regards beauty and utility stands the Viola arborea; a bed now before me, nine feet long by three feet wide, is a complete carpet of deep purple, and, on a moderate calculation, there are, at the time I am writing (April), 3600 fully expanded blooms on it. The Violet may be cultivated to any extent by dividing the roots, and the latter end of May is the best time for the purpose, at which time they should be divided into single pieces, either rooted, or as cuttings, and planted in the reserve beds six inches apart each way; the most suitable soil is a fresh sandy loam, and rotten leaves. In dry weather in the summer, they are very much benefitted by copious supplies of water. By October they will be very nice plants, and may be taken up with a ball, and transferred to the (by that time) empty beds in the flower garden. I would next suggest the different varieties of double primroses, plants of very easy culture, and exceedingly appropriate for spring decoration; the colours I possess are white, yellow, pale red, buff, and deep crimson, the latter rare, but very beautiful. These also should be divided at the end of May, and planted in the reserve beds, and will bear moderate shade; soil, fresh sandy loam and leaf mould.

Polyanthuses and Alpine Auriculas, of which there is an infinite variety, will come under the same remarks.

Hepatica; white, red, blue. These pretty plants are very abundant flowerers, and universal favourites, and are easily increased by division after flowering, but being of slow growth, there had better be a double stock kept in the reserve garden, as they are best to remove into the flower beds at two years growth.

Pulmonaria angustifolia, violet, officinalis, pink, azurea, blue. Some of our searchers after novelty will smile at my recommending these plants, the two first being indigenous, but smile or not, they are very pretty, and being abundant flowerers, are very applicable to our purpose, are readily increased by division, and not particular as to soil.

Erythronium dens canis albidum, white; longifolium, rose; both so beautiful that too much cannot be said in praise of them; very showy indeed in a mass. These are bulbous plants, which increase very fast. By the end of May they may be taken up and laid into a light soil in a warm situation, to ripen the bulbs. When ripe take up and store.

Anemones; double and single, many shades of colour; very beautiful. Plant early in November, previously dressing the beds well with good fresh loam. In very severe weather they should have a covering of three inches of rotten leaves. The best of their flowering is over before the beds are wanted for summer plants, and they may be taken up and laid in to ripen as before directed for Erythronium. The Anemone stellata, a bright scarlet, is excellent for our purpose, and remains in the ground all the year. It is increased by division, and beds may be made in the reserve garden.

Hyacinths many colours, remarkably showy and beautiful, and desirable in every sense of the word. Plant early in November, rather deep; after flowering they will ripen well, laid in, in a warm situation.

Turban Ranunculi; scarlet, dark crimson, and yellow. Nothing can exceed the beauty of these plants; their dazzling brilliancy of colour renders them universal favourites. Plant early in November, in rows six inches apart, and three inches plant from plant. They delight in fresh sandy loam and leaf mould, and require a covering of rotten leaves in severe weather.

For small beds I recommend the rare and beautiful Scillas: sibirica, blue; bifolia, lilac, bifolia alba, pure white, carnea, pink; præcox dark blue; these all require a light soil and careful treatment, and, strictly speaking, are better adapted for edging other beds, than for planting in a mass, as their flowering season is not very long, but their extreme beauty renders them very desirable. The bulbs should be planted in November, and treated as before.

Lastly, as it is desirable that some of the largest beds should be planted with dwarf evergreens and other plants from pots, I would recommend the spaces amongst them to be planted with Crocus, many varieties; the beautiful snow-flake, or Leucojum vernum; the infinite variety of Narcissus, so beautiful and so easily cultivated, that I cannot but wonder that we so seldom see justice done to them; Fritillaria several dwarf species; Adonis vernalis; Fumarias, several species; Sanguinaria canadensis, and grandiflora; Trillium grandiflorum; Orobus vernus; Arabis præcox; and variegata; Silene saxifraga; Muscari botryoides. Pansies may also be introduced, and the whole cleared off by the end of May, ready for bedding plants.

Since writing the above I perceive a suggestion on the subject brought forward, and I shall feel very much gratified if my paper prove but the forerunner of other and more valuable articles.

A NOTE ON THE CULTIVATION OF THE NEAPOLITAN VIOLET.

By Mr. W. TAYLOR, Gardener to J. Coster, Esq., Streatham.

THIS being an acknowledged favourite in every establishment, it ought to be in every garden of any pretensions in the country. This being the time of year best suited for its propagation and cultivation, I have thought a few simple directions for the guidance of your numerous amateur readers would not be unacceptable. As early in the month of April as the plants are out of bloom they are taken out of the soil they have grown in, and are divided into single crowns, divesting them of all runners, and choosing only the most healthy plants They are then carefully planted with a trowel on a piece of rich well prepared ground nine inches apart each way, pressing the soil firm round the roots.

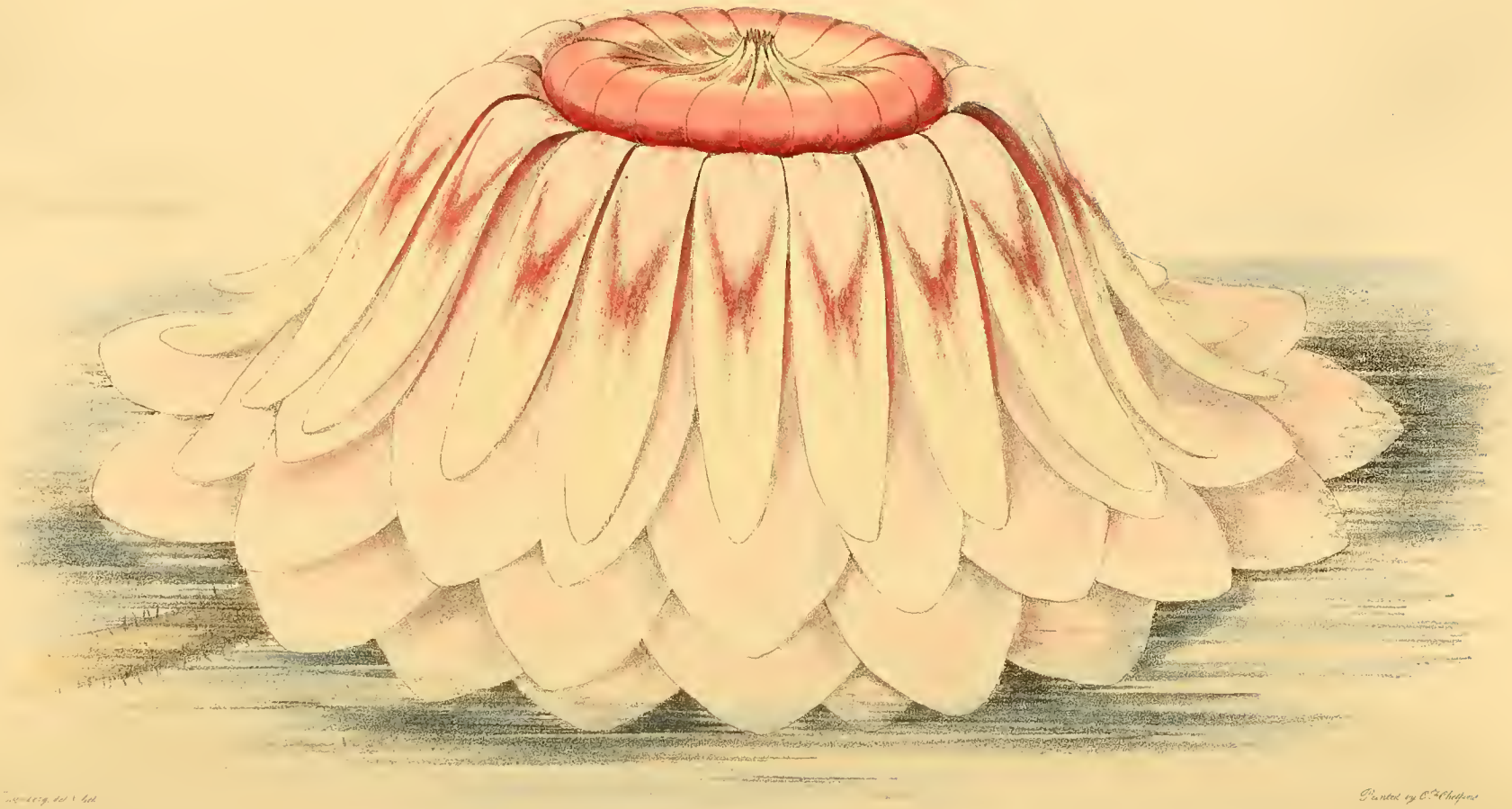
The situation I find them do best in, is an east aspect, where they only receive the morning sun, by which means I am able to keep them free from that pest, the red spider, and by so doing the flowers are of a larger and brighter colour. After the plants shew signs of growth the surface soil is slightly loosened with a small hoe, and in hot dry weather I frequently syringe the plants with clean water in the afternoon. All runners are pinched off as they appear, and the plants are kept free from weeds.

If it is desirable to have violets early in autumn, runners should be laid, either in pots or the soil they are growing in, in February. By selecting a few of the strongest runners and pegging them down with a little soil over the stem, and keeping them moist, they will be ready to plant out singly with a ball of earth attached to their roots early in April, and by treating them as above they will come into flower a month earlier than the divided plants; but they must be placed in their winter quarters by the first week in September.

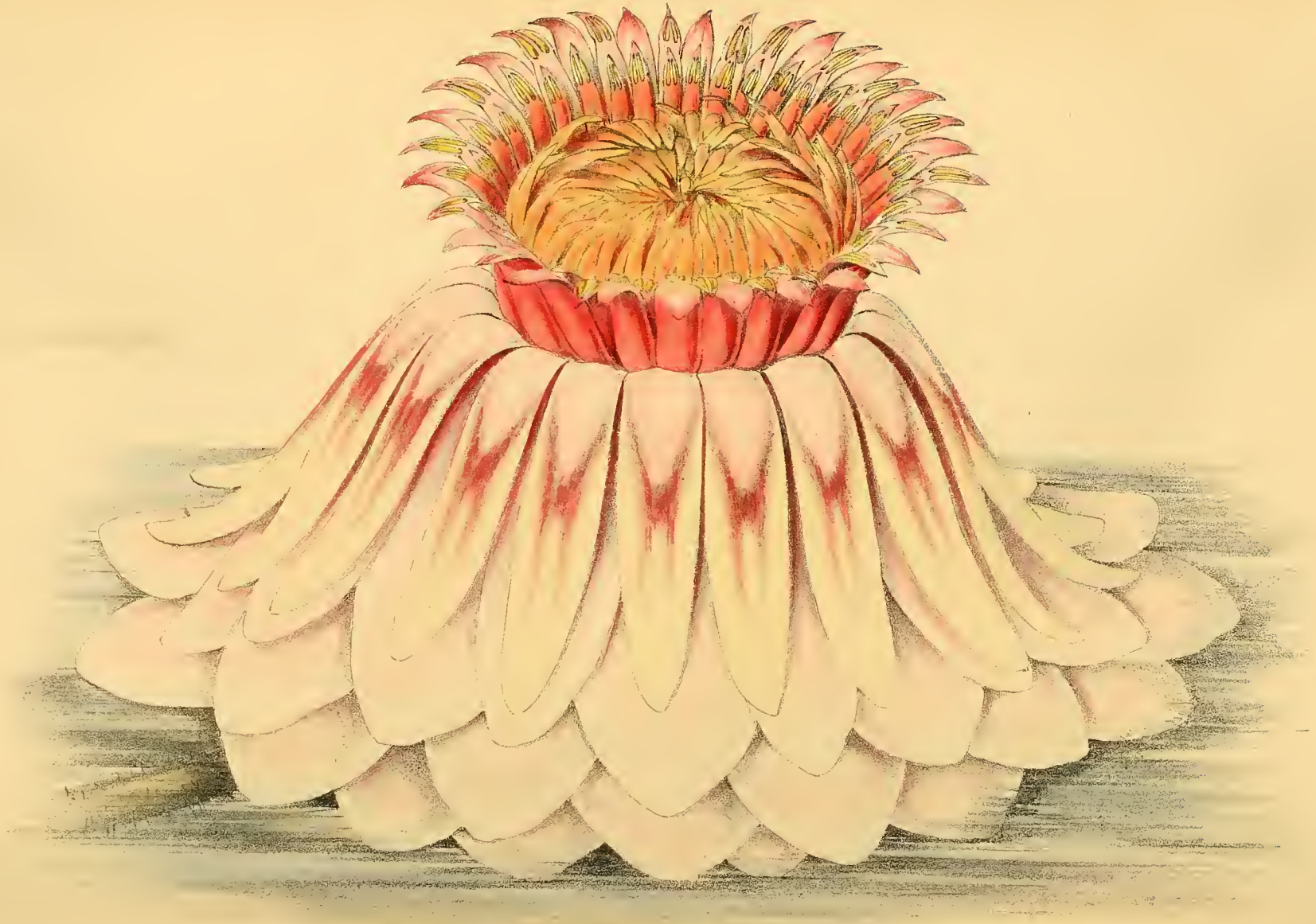
It is immaterial whether they are potted in six inch pots or planted in a bed of soil in a frame or pit. I plant most of my plants in a bed as they are less liable to suffer for want of water; and as the object is for cut flowers only, they require less attention. Otherwise they will grow equally well in pots, and are, when well bloomed, convenient to take into the hall or drawingroom.

When the time arrives for placing them in their quarters, I have some well prepared dung ready as if for making a cucumber bed, and either build a bed or sink it into the ground two feet thick, well treading the dung down to prevent a very violent heat, over which I place a foot thick of soil (old cucumber soil) with a little leaf mould added. The plants are then carefully removed with a large ball of earth adhering, and are planted in rows rather close together, but not to touch each other. The foliage should be close to the glass so that they do not touch it, as there is sure to be a slight settlement in the dung. When the planting is completed, they should have a good watering to well saturate the entire mass of soil, and during mild weather in the month of October I expose them frequently to a good soaking rain, by which means I keep them more clean and healthy than by nursing them in a dry atmosphere. On all fine mild nights I take the lights entirely off, which they appear to enjoy; but on no account allow them to become frozen, as that retards their blooming. If any yellow or decaying leaves appear in the months of November or December they are immediately removed, as they are very injurious as well as unsightly.

By the above treatment I am enabled to gather a supply of violets from November till April.



Victoria regia before its fullest expansion



VICTORIA REGIA.

Nat. Order, Nymphæaceæ, ♀ Euryaleæ.

Generic Character.—Victoria, *Lindley*. *Tube of the calyx* sub-globose, adherent to the ovary, expanded into a torus at the throat; *limb* 4-parted, deciduous, coloured. *Petals* numerous, inserted on the throat and torus of the calyx; outer ones at length completely reflexed, longer than the calyx, the interior by degrees narrower, acuminate, rigid, approaching the form of the stamens. *Stamens* numerous, inserted with the petals on the torus in about three rows, fertile; the *filaments* subulate, petaloid, but rigid and firm, at length erect; *anthers* introrse, the cells situated below the apex, linear-elongate adnate. Within the stamens the torus is prolonged upwards and inwards for about an inch, arching over inwards; on its margin is borne a circle of conical, fleshy, somewhat recurved, horn-like processes. *Ovary* globose below, concave-campanulate at the top, marked with rays setting out from a central beak, many-celled, the cells at first arranged regularly in one circle, afterwards becoming irregular by mutual pressure, with many ovules; *ovules* anatropous, parietal, affixed to a spongy, reticulated placenta by short funiculi; *styles* wanting (connate into a furrowed bell clothing the tube of the calyx, *Lindley*); *stigmas* forming radiating lines on the top of the ovary (*R. Brown*). There exist also about thirty large, fleshy, incurved, somewhat scroll-shaped bodies, forming projecting ridges at the outer ends of the rays of the top of the ovary, their outer faces being blended with the concavity of the vaulted portion of the torus. These have been described as stigmas.

Fruit baccate, globular-campanulate or cup-shaped, truncate, campanulate above, beaked in the centre, many-celled, cells many-seeded. *Seeds* oval-globular, with a horny testa, and copious albumen.

A vast aquatic herb, inhabiting still rivers in the north of South America, east of the Andes; rhizome perennial? Leaves gigantic, floating, orbicular, peltate, flat, the margin elevated all round, radiately and reticularly ribbed, the ribs very prominent below, on very long foot stalks, the vernation of the lamina corrugated-involute; flowers large and handsome, at first whitish, becoming rose, especially within, peduncles elongated; roots adventitious, breaking out below the insertion of the leaves on the rhizome; petioles, peduncles, calyx-tube, and the ribs of the leaves below, with abundant large and acute spines.

Victoria regia, *Lindley*. Victoria Water Lily.—The only species.

Synonymy.—Victoria regia, Lindley; *Manograph on Victoria* (with plates), privately printed in 1837; *Botanical Register Misc.*, 1838, p. 9; D'Orbigny, *Ann. des Sc. naturelles*, 2nd ser. *Botanique*, vol. xiii., p. 57; Walpers, *Repertorium*, vol. i. p. 106; Schomburgk, *Views in the Interior of Guiana*, p. 2, frontispiece; *Botanical Magazine*, 3rd ser., vol. iii., 1847, p. 1, tab. 4275–4278.

Victoria regina, Gray, *Mag. of Zool. and Botany*, vol. ii., 1838, p. 440.

Nymphæa Victoria, Schomburgk, MS.

Euryale Amazonica, Pöppig, *Froriep's Notizen*, vol. xxxv., p. 9; *Reise*, vol. ii., p. 432.

Victoria Cruziana, D'Orbigny, l. c., p. 57, (leaves of the same colour on both sides, petals all rose coloured.

DESCRIPTION.—A large aquatic herb, with a perennial rhizome large and tuberous, with internodes scarcely developed, furnished with numerous cylindrical adventitious roots abounding in air cavities; the rhizome thick, of a brown colour externally, white within, changing to purple when cut (Schomburgk), decaying at the base as it developes leaves, flowers, and roots above, growing in 4-6 feet water. Petioles long, terete, clothed with copious prickles. Leaves floating, very large, 4 to 6½ feet in diameter; when first expanded, oval with a deep narrow cleft at one end, almost exactly orbicular when full-grown, peltate, with the margin turned up all round, forming a rim like that of a tea-tray; the upper side of the blade full green, with numerous reticulations forming somewhat quadrangular areolæ; the under side deep purple, or, according to D'Orbigny, sometimes green, (brownish red in the specimen from which our drawings were made), clothed with short spongy pubescence, with very prominent flattened ribs set edgeways on the lamina, radiating from the petiole to the circumference, and progressively diminishing in depth; these are united by cross ribs, also vertical plates, and the latter again by less elevated ones crossing them, so that the under surface is completely divided into quadrangular chambers, of which the ribs form the sides, and the general surface of the lamina the top, and as these detain air within them, they act as floats; all the ribs are more or less beset with spines, varying in length, sharp and horny, enlarged at the base. Vernation of the lamina corrugated-involute, that is, the greater part wrinkled up like the petals of the poppy, with the margin rolled in on all sides. Peduncles all axillary, from the rhizome, longer than the petiole (?), and rising above the surface of the water when the flower expands, terete, prickly, very copiously furnished with air-cavities, one-flowered. Flower 10 to 15 inches in diameter, somewhat pear-shaped in bud, fragrant. Calyx deeply 4-parted; the tube turbinate, green, very prickly, adherent to the ovary; the lobes of the limb large, oval, reddish purple, concave, deciduous, a little prickly on the outside towards the base, rather shorter than the petals. Within, at the throat, the calyx enlarges into an annular torus bearing the petals and stamens. Petals very numerous, the outer ones larger than the calyx, oblong, concave, obtuse, the inner ones gradually becoming narrower, much acuminated, and insensibly passing into petaloid filaments. When the flowers expand, which they do for the first time about five P.M., they rise five or six inches above the surface of the water, and become about half unclosed; at this time all the outer petals are white; this condition persists until about ten A.M. the next day, when the flower closes; about two P.M. of the same day it re-opens, assumes an upright position in the water, and the outer envelopes, which by degrees acquire a continually deepening pinkish colour, become completely reflexed, so that their summits touch the water all around; more and more of the erect petals are reflexed until only the strongly incurved filament-

ous petals of a rose colour remain closed up; but these very soon assume an erect position, spreading on all sides at the summit, so as to form a rose-coloured crown surrounding the essential organs, the yellow colour of the stamens then becoming visible in the interior. About ten P.M. the same night it closes permanently, and sinks below the water to ripen its seeds. The stamens are in about three circles, large, subulate, incurved below; anther-cells double, linear, introrse, occupying the inner face of the filament below the apex. Within the fertile stamens the torus is prolonged inwards for about half an inch, forming an arch over the stigmas, and bearing on its margin a circle of somewhat recurved, fleshy, horn-like bodies. Pollen apparently with a single coat. Ovary adherent to the whole length of the prickly tube of the calyx, and thus turbinate like it, with a deep radiated depression or cavity at the top, and in the centre a small conical beak or column; it may therefore be called cup-shaped, with a thick fleshy base, having air-cells extending down into the peduncle; in this fleshy substance are contained twenty-six to thirty compressed cells, arranged at first in a very regular circle near the rim of the cup; as the ovules enlarge, the cells gradually come to occupy the whole thickness of the germen, and by their mutual pressure are rendered irregular in arrangement and form; their parietes consist of a reticulated spongy structure, partially gelatinous, and the ovules are attached to the reticulations by short funiculi, the funiculus being turned toward the axis of the ovary. The stigmatic surfaces are upon the rays on the top of the ovary. At the ends of these rays occur about thirty somewhat scroll-shaped or uniform, spongy, incurved, projecting bodies, which were formerly taken for stigmas, but are mere processes from the inside of the vault of the torus connected at their bases with the ends of the stigmas; the circle formed by the points of their junction is about three-quarters of an inch below the insertion of the petals and stamens, and *within* the cup formed by the torus and calyx tube. The seeds are rather large, imbedded in the spongy placentas, with a horny testa, yellowish when young, and brownish or black afterwards, with copious albumen.—A. H.

History, &c.—The Victoria inhabits the still waters of all the great rivers of the South American continent, which flow into the Atlantic Ocean: such as the tributaries of the Amazon, the La Plata, the Essequibo, &c. The rapid movement of the streams flowing into the Pacific has been suggested, by Sir W. J. Hooker, as the probable reason why (as appears to be the case) it is absent from them.

The first discovery of this Royal Water Lily attaches to Hænke, who found it, in Bolivia, about the year 1801. Bonpland, the companion of Humboldt, in his South American travels, met with it in the same country, some time afterwards. D'Orbigny found it in Paraguay, in 1827; and also met with it (1832) in Bolivia, where it has again more recently been found by Bridges. In the same year (1832), Pöppig found it in the country of the Amazons. Sir R. Schomburgk (by whom it was first especially brought into notice in England, through a drawing and communication presented to the London Botanical Society) found it, in 1837, in British Guiana, and more recently (1842) in one of the tributaries of the Essequibo. His account of the incidents of its discovery, though often quoted, is so graphic, that we must here introduce a passage or two of it.

"It was on the 1st of January, 1837, while contending with the difficulties that Nature interposed, in different forms, to stem our progress up the river Berbice [British Guiana], that we arrived at a part where the river expanded, and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention, and I was unable to form an idea what it could be; but, animating the crew to increase the rate of their paddling, we soon came opposite the object which had raised my curiosity, and—behold, a vegetable wonder! All calamities were forgotten: I was a botanist, and felt myself rewarded! There were gigantic leaves, five to six feet across, flat, with a broad rim, light green above, and vivid crimson below, floating upon the water. Quite in character with the wonderful foliage, were the luxuriant flowers, each consisting of many hundred petals, passing in alternate tints, from pure white to rose and pink. The smooth water was covered with the blossoms; and as I rowed from one to the other, I always found something new to admire. . . . The young leaf is convolute, and expands but slowly. The prickly stem ascends with the young leaf till it has reached the surface; by the time it has developed, its own weight depresses the stem, and it floats on the water. . . . When the flower first opens it is white, with pink in the middle, which spreads over the whole flower the more it advances in age, and it is generally found the next day altogether of a pink colour. As if to add to the charm of this noble Water Lily, it is sweet-scented. Like others of its tribe, the petals and stamens pass gradually into each other, and many petaloid leaves may be observed which have vestiges of an anther. The petals next the calyx-leaves are fleshy, and possess air-cells, which must contribute to the buoyancy of the flowers. We met with the plants frequently as we ascended the river, and the higher we advanced the more gigantic they became: we measured a leaf which was five feet six inches in diameter: its rim five and a-half inches high; and

the flower fifteen inches across. A beetle infests the flowers, to their great injury, often completely destroying the inner part of the disc; we counted sometimes from twenty to thirty of these insects in one flower."

According to D'Orbigny, the fruit, which, when ripe, is half the size of a man's head, is full of roundish farinaceous seeds, which are collected, washed, and eaten, forming a valuable article of food. From this circumstance the plant is called *Mais del Agua*, or Water Maize. The same traveller states, that the people of Guiana call it *Irupé*, or *Yrupé*—literally, Water-platter, from the broad dish-like leaves. Pöppig says it is called *Mururá;* while, according to Bridges, the Moinas, or natives of Santa Anna, call it *Moringua;* and a neighbouring nation, the Cayababas, call it *Dachocho.*

"The Victoria," writes Mr. Bridges, in a letter published in the *Botanical Magazine,* "grows in four to six feet of water, producing leaves and flowers, which rapidly decay, and give place to others. From each plant there are seldom more than four or five leaves on the surface, but even these, in parts of the lake where the plants were numerous, almost covered the surface of the water. . . . From what I observed, I conclude that it cannot and does not exist in any of the rivers where the immense rise and fall of twenty feet would leave it dry during many months of the year, especially in the season when there is no rain. The lagoons, being subject to little variation in the height of their waters, are the places where it grows in all its beauty and grandeur. The Victoria appears to delight in parts of the lake fully exposed to the sun, and I observed that it did not exist where the trees overshadowed the margins."

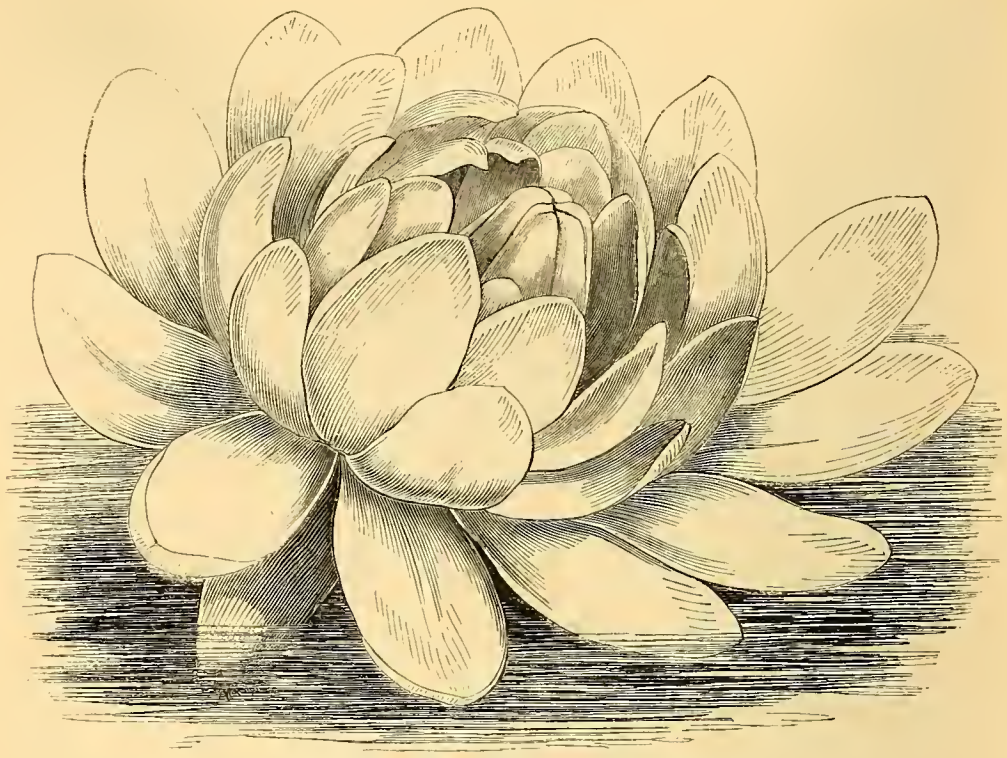
Both in the wild and cultivated state, the flowers exhale a very peculiar fragrance. On this point Mr. Bridges, in the letter already referred to, writes:—"I had an opportunity of experiencing the fragrance of the flowers. Those I collected for preserving in spirits were unexpanded, but on the point of opening. On arriving at the Government House in the town [Santa Anna], I deposited them in my room, and returning after dark, I found to my surprise that all had blown, and were exhaling a most delightful odour, which at first I compared to a rich Pine apple, afterwards to a Melon, and then to the Cherimoya; but, indeed, it resembled none of these fruits, and I at length came to the decision that it was a most delicious scent, unlike every other, and peculiar to the noble flower that produced it."

Though discovered long ago, it was not until August, 1846, that fresh seeds of the Victoria reached England. From this importation it does not appear that more than two plants were raised, and these at the Royal Botanic Garden of Kew. Their history may be thus told:—"By the month of October they were in a thriving condition, but soon after that time they began to show symptoms of decay, and by the 12th of December they were both dead." These seeds had been collected in Bolivia by Mr. Thomas Bridges, and were brought to England in a bottle containing a small quantity of moist earth.

The next importation consisted of roots. These were sent to Kew in a glazed case, and arrived on the 10th of October, 1848. They had been obtained from the Upper Essequibo, by Indians employed for the purpose by E. G. Boughton, Esq., M.D., of Leguan Island. On examination they all proved to be dead and decayed. Dr. Boughton sent by the mail of the following month some dry capsules containing seeds, and shortly afterwards other seeds in a bottle of muddy water; but in neither of these cases did the seeds vegetate.

The next attempt was more successful. Hugh Rodie, Esq., M.D., and — Luckie, Esq., of George Town, Demerara, obtained seeds which they forwarded to Kew by the mails, in small phials filled with pure water; these, on their arrival, were found to be quite perfect. The first arrived on the 28th of February, 1849, and others came by the three next following mails. By the 23rd of March, half a dozen seeds had germinated, and were in a thriving condition; and others continued to germinate, so that by the end of summer upwards of fifty plants had been raised, about half of which were distributed among the principal cultivators of rare plants. Up to the present time, however, we hear of two only of these having been made to produce blossoms, namely, that at Chatsworth, and that at Syon, whilst many of the remainder have perished.

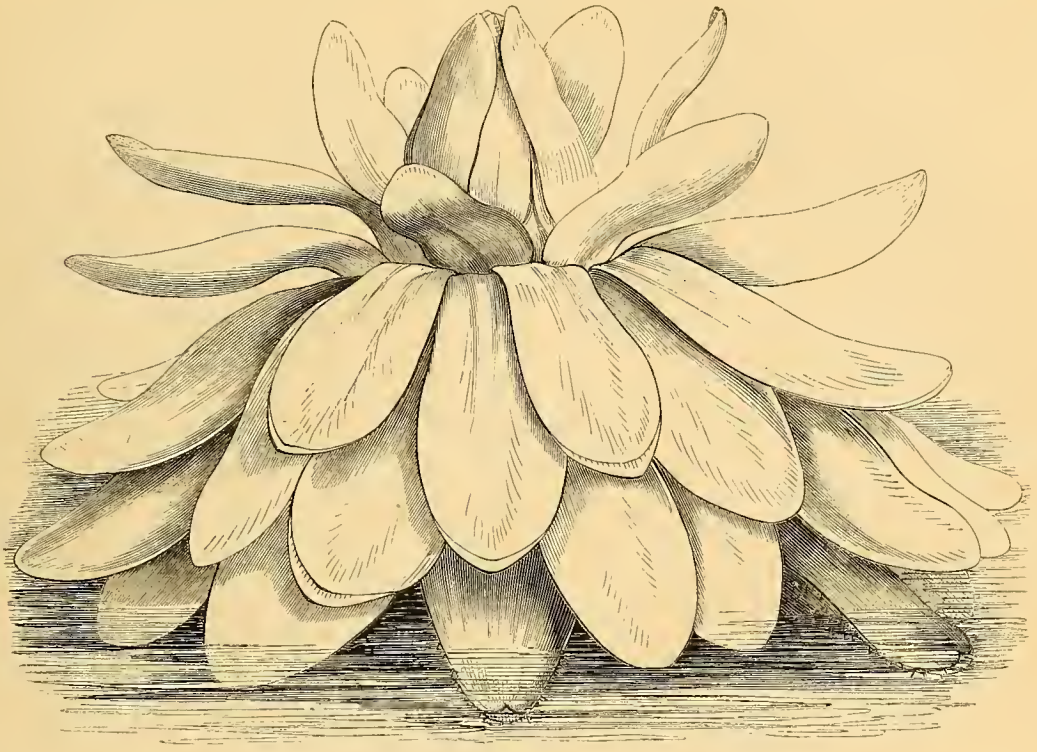
The first flowers were produced in the garden of the Duke of Devonshire, at Chatsworth, under the care of his Grace's gardener, Mr. Paxton, and his assistant, Mr. George Eyles. One of the earliest of these blossoms, Mr. Paxton had the honour of presenting to her Majesty the Queen, to whom the genus is dedicated. The details of the progress of the Duke of Devonshire's plant have been published in *The Gardeners' Chronicle,* from which source most of the following statistical facts are drawn:—The plant was one of those raised at Kew, in the early part of March, 1849. It was received at Chatsworth on the 3rd of August, having then four leaves, the largest measuring five and a-half inches in diameter. On the 10th of August, it was planted out in a tank prepared for it. The first flower-bud was



FLOWER OF VICTORIA REGIA, AS ON FIRST DAY OF EXPANSION.

observed on the 1st of November, it was partially expanded on the 8th, and fully and finally on the 9th. By this time thirty-one additional leaves had been produced, the largest of which measured four feet ten and three-quarter inches in diameter. Some of the more vigorous leaves are, at particular stages of their growth, recorded to have increased in diameter at the remarkable rate of sixteen or eighteen inches within twenty-four hours. The largest flower produced on the Chatsworth plant, in the autumn, was ten and a-half inches in diameter. From this plant ripe and perfect seeds were obtained early in December. Some self-sown seedlings were observed about the middle of the February following, and a considerable number of young seedling plants were raised shortly after; the old plant, in the meantime, though resting in winter, continuing in perfect health, and progressing rapidly in growth, with the advancing spring, thus apparently setting at rest the question which had been raised, as to whether the species was annual or perennial. The rapidity with which its growth had been matured, and its seeds perfected, gave rise to the opinion that it was but of annual duration, which notion obtained apparent confirmation in the fact of the decay of almost all the other unbloomed plants that had been raised, on the approach of winter. On the other hand, an account of its being successfully transplanted at George Town, in Demerara, and the description given of the rootstock, or trunk, by collectors, led to the hope of its being perennial; whilst Mr. Bridges, who sent the earliest seeds which reached England, spoke of it as decidedly perennial. The continued growth of the Chatsworth plant, after flowering and seeding, may be taken as nearly conclusive evidence of the latter. This plant continued to bloom through the winter, but the flowers produced on the return of spring have proved to be larger than those which were developed in the preceding autumn. The largest flower produced at Chatsworth, of which we have any record, was thirteen inches in diameter.

The urbanity and liberality of his Grace the Duke of Northumberland, in whose princely gardens, at Syon House, the second flowering example of the Victoria has been reared, have enabled us to lay before our readers the present series of drawings of this truly Royal plant. The sketches represent the remarkably diversified stages through which the flowers pass, during the two days on which each is expanded. The two wood engravings show the appearance of the flowers as seen on the first day of expansion, and at one of the earlier stages of expansion on the second day. The



FLOWER OF VICTORIA REGIA; FIRST STAGE OF SECOND DAY'S EXPANSION.

coloured figures show the two last, and most distinct and beautiful, stages, before the final closing of the blossoms, We understand that these changes have been observed, at Syon, to take place with remarkable regularity as regards the hour of the day at which the several stages of developement were reached. The flower first opens about five P.M., and is pure white (see p. 228); it continues expanded all night, closes about ten A.M. on the following day, and so remains till two P.M., when it begins again to expand; about four o'clock, it has the appearance shown in the wood engraving given above; between five and six, the stage shown by the coloured figure with the depressed crown is reached; and towards seven, that represented by the other coloured figure; in this state it continues until about ten P.M., when it finally closes. Although these several conditions are attained at about the hours specified, it must be understood that the expansion goes on gradually, until the full development has been reached. The blossoms we examined were about a foot in diameter, and six inches in height.

One curious fact connected with the Victoria Water Lily is the extreme buoyancy of its large succulent foliage, occasioned by the presence of large air-cells in the thick ribs which cover like network the under surface, much aided no doubt by its large surface, and the deep pit-like recesses formed between the interlacing veins. A child seven or eight years of age is said to have been supported by a leaf of the Chatsworth plant. The weight was, however, in this instance, distributed by means of a piece of board laid on the leaf, and on which the child stood.

CULTURE.—Mr. Ivison, the gardener at Syon, under whose clever management the plant has progressed in a way so entirely satisfactory, has favoured us with the following particulars as to the treatment he adopted, and its results. We need hardly mention that the atmosphere maintained was that of a tropical plant stove:—

"The plant at Syon was received from Kew in the second week of September, 1849, being one of the number which was distributed about that time. It had then four leaves, the largest being about four inches in diameter. It was placed at once under similar treatment to that which was so successfully pursued with the Nelumbiums in these gardens some years back, the basis of which was a constant circulation of the water in which they were grown. This was effected by placing three tubs at different elevations. The upper one rested immediately over a hot water pipe. This warmed the water, which

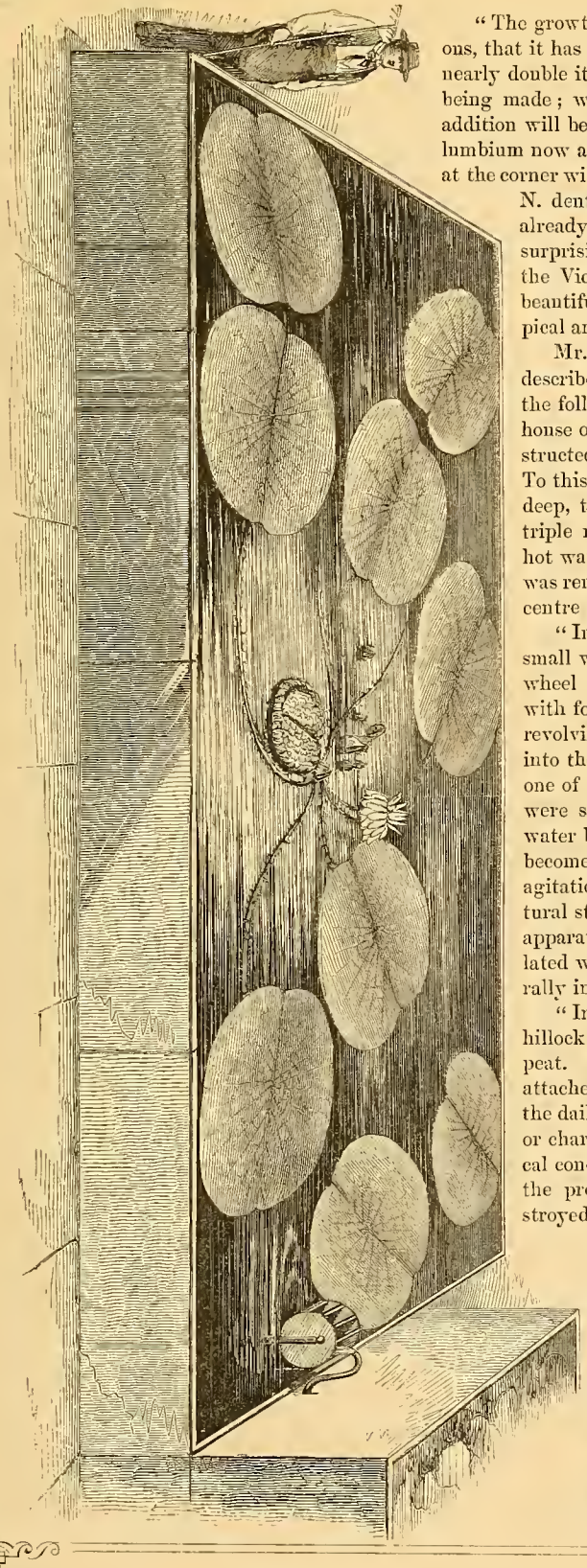
was then conveyed by a syphon into the one below, in which the Victoria in a pot was placed, and which was plunged in a bark bed. From this the water was conveyed by a pipe into the third and lowest tub, from which it was returned into the upper one, again to follow the same course of circulation. Under this treatment, the plant soon became too large for its original pot, and in about two weeks it was shifted into one of a much larger size; and, continuing rapidly to increase its dimensions, it was removed into a wicker basket about two and a-half feet in diameter by two feet deep. About the same time the size of the tub was enlarged by fixing sheet lead to the upper part of it, and dressing it out into a superficies of six feet square, and about three inches deep at the sides, thus allowing room for the increased length of the leaf-stalks. In this situation it remained, producing a succession of healthy leaves, until January 5, 1850. It was then removed into a low-roofed lean-to house, in which Mr. Beck had been ordered to prepare a slate tank for its reception, twenty-two feet long by twelve feet wide, and arranged in the following manner:—the central portion was made two feet six inches deep for the reception of the soil; the remaining part, over which the leaves were to expand, was only one foot deep, which has been found amply sufficient. At one end, and elevated above it, is placed a cistern through which pass two two-inch hot water pipes, connected with a single one of the same size descending from it and continued all round the shallow part of the large tank below, whilst the centre and deeper part is heated by a four-inch pipe passing entirely round it. These pipes are all connected with a boiler, which heated the building before it was applied to its present purpose.

"That this may be clearly understood I will enter a little more into detail:—A large reservoir receives all the rain water which falls on the glass erections in this part of the gardens. From thence it is pumped up into a cistern which supplies the smallest one placed above the tank in which the plant is growing; thence, passing through a cock, it falls upon a small wheel which, revolving gently, agitates the water, and this, flowing towards a waste pipe, again finds its way into the reservoir, from which it originally came—thus keeping up a continued and healthy circulation. The water is kept at an equable temperature of about 85 degrees Fah. by the hot water pipes arranged as before described.

"The soil in which the Victoria was planted consisted of three cart loads of good old turfy loam, which had lain in heap for two or three years. Previously to placing it in the tank, six inches of broken brick-bats were laid on the bottom, and covered with turves of peat. On these the soil was laid in a conical form, rising to within six inches of the surface of the water, and in the centre of this the Victoria was planted. For three weeks after its removal into its new home there was scarcely a sunny day; indeed it was generally very foggy weather; and during this time it only existed, making no apparent progress. The weather then changed, and it immediately showed evident symptoms of growth. On February 1, I discovered on the surface of the soil several white roots, unmistakeable evidences of health under water; on the third it produced its first healthy leaf since its removal; by the tenth this was ten inches in diameter; at the end of the month seven leaves were formed, the largest of which was sixteen inches in diameter; during March it added nine other leaves, the diameter of the largest being nearly four feet. On April 1, I discovered the first flower bud, and on the 10th the flower began to open. It first opened about five o'clock P.M., continued open all night, and closed about ten A.M. on the following day. On that day (April 11) it began to open about two o'clock, P.M., having gone through its various stages, reached its full expansion about six, when it was at its greatest beauty; it continued thus for about four hours, when it began finally to close preparatory to seeding. On the third morning the remains of the flower were partly under water, and gradually sank lower, but the flower stalk continued to lengthen for some time afterwards.

"I may here observe that, on the morning of the day on which the flower first expanded, the bud was seen to move itself as far as possible in one direction, then back again in a semi-circle, and finally raised itself out of the water to rest and expand upon the young leaf, with which it was produced. Just before opening, and during the whole of the first night, the flower is very fragrant,—the perfume being that of the Pine apple; this odour is distinctly perceptible outside the house.

"At the present time (May 6) the tenth flower is expanded; it is twelve inches in diameter. I find that each succeeding flower increases in size. There are now four more flower-buds visible; in fact, with every young leaf, comes its attendant flower-bud. Since the 10th of April the Victoria has been in flower for two successive days, missing the following one, with very little variation. The largest leaf is now five feet in diameter, with an inch and a-half of its edge turned neatly up, and forming a beautiful rim; the under surface being of a purplish red colour, and contrasting well with the deep green of the upper portion. The formation of the under side of the leaves is very beautiful; the large veins near the centre are about two inches deep, gradually shallower towards the edge, and connected with each other by means of smaller ones, altogether forming a strong network, the whole being armed with powerful spines.



"The growth of the plant has latterly been so vigorous, that it has become necessary to enlarge the tank to nearly double its original size. This alteration is now being made; when completed, the deeper portion of the addition will be planted with the different species of Nelumbium now advancing towards a flowering state; and at the corner will be placed Nymphæa rubra, N. cœrulea, N. dentata, and N. odorata, most of which are already in flower, and are found to grow at a surprising rate in the temperature kept up for the Victoria. Altogether, I hope to form a very beautiful, fragrant, and interesting group of tropical and other aquatics."

Mr. Paxton's mode of cultivation has been described in the *Gardeners' Chronicle*, whence the following particulars are taken:—"In a hothouse of sufficient dimensions, a tank was constructed three feet deep, and twelve feet square. To this was added a ledge all round, nine inches deep, three and a-half wide, and heated by a triple row of small lead pipes, through which hot water circulated. By these means the tank was rendered nineteen feet square, with a deep centre and shallow sides.

"In order to keep the water in motion, a small wheel was added at one corner; over that wheel water was caused to drop continually with force enough to keep the wheel constantly revolving; the water thus continually flowing into the tank is carried off by a small pipe in one of its corners near the bottom. In this way were secured the important advantages of the water being so often changed that it could not become stagnant, together with ceaseless gentle agitation. Nothing could be more like the natural state of a tranquil river. By the heating apparatus its temperature could also be regulated with facility. The thermometer has generally indicated 85 degrees.

"In the centre of the tank was introduced a hillock of earth, consisting of *burnt loam* and peat. To the burning of the loam Mr. Paxton attaches great importance; and this agrees with the daily experience of those who employ burnt or charred materials in gardening. The physical condition of the soil is much improved by the process, and the weeds and insects are destroyed. Mr. Paxton is also of opinion that the removal by fire of all matters ready to enter into fermentation or rapid decomposition when in contact with water heated to 85 degrees, was in itself no inconsiderable cause of the success of his experiment; in addition to which it preserved the water perfectly translucent."

The agitation of the surface of the water—no doubt beneficial—it has been suggested to effect by means of small ornamental water-fowl of a tropical race.

Without entering into the various speculations offered as to the cause of the many failures in the attempts made to cultivate this plant—for which, indeed, we have not space—we may venture briefly to express our own conviction that success has not been the result of any one condition applied with more than ordinary skill; and, therefore, is not to be traced, specially, either to uninterrupted bright light, or the purity of the water as influenced by charred soil; but, rather, has been the reward of a skilful combination of the conditions which represent artificially the tropical climate and peculiar circumstances which the plant naturally enjoys. These conditions are, in brief: light, clear and free; water, pure and constantly changing; heat, steady and powerful, though not excessive, in respect both to the water and the atmosphere—all these combined and acting in concert.—M.

THE CHEMISTRY OF SOILS AND MANURES.

By Dr. A. VOELCKER, Professor of Chemistry in the Royal Agricultural College, Cirencester.

INTRODUCTORY.

TO the peculiarities of the present time belong the rapid progress of natural science, the striking and important discoveries with which the labours of some of the most accomplished natural philosophers have been rewarded, the high esteem in which the study of nature is held by the public at large, and the general desire for information which makes itself felt in places where, hitherto, the rays of the light of science failed to penetrate. The spirit to reform and revolutionize, till now confined to religion and politics only, no longer regards these topics as its own exclusively, but extends its mighty influence over an extensive range of subjects, and is manifesting itself likewise in producing those changes in the system of education, which have tended greatly to secure to natural science a place in the affections of all classes of society, which it did not possess twenty years ago. Indeed, no man of sound judgment will regard instruction in natural history and philosophy superfluous in a system of liberal education, and many professional men—the physician, the artist, the manufacturer, &c.—will fail to be successful in their different callings, if they be ignorant of the principles of natural science. A sure safeguard against ruin in these times of competition is increased knowledge; for knowledge is power, and certain to benefit its possessor.

Can we then feel surprised when we see an intelligent manufacturer, farmer, or gardener, who has paid some attention to the study of natural science, succeed in his undertakings, whilst many, who have not paid that attention, fail? On the contrary, what surprises us is, that this truth is not universally admitted, or, we should rather say, is too frequently forgotten; for we do not conceive how any one who has given a moment's thought to this subject, can hesitate to admit the fact that the artist, manufacturer, or gardener, who is acquainted with the principles of natural science, so far as to understand the nature of the suggestions made from time to time by the man of science, and to reduce them into practice, or to call into life new improvements, possesses considerable advantages over others who lack this kind of knowledge—advantages which will secure him almost certain success in entering into competition with the latter. It is just the usefulness, the extensive application, which can be made of any branch of natural science, and the material benefits already derived from the labours of the chemist, botanist, and geologist, which has contributed more than anything else to the greater appreciation of natural science. The peculiar feature of most of the recent discoveries made in chemistry is, that they are all, more or less, characterized by a practical tendency; hence the extensive and general application which chemistry finds in the various occupations in which man is engaged, and the high esteem in which this branch of science is held by practical men. Though chemistry, in common with any branch of natural study, will afford real and lasting pleasure to the student, and tend to sharpen his powers of observation and judgment; it is, nevertheless, chiefly on account of its practical utility, that it is now more extensively taught, and better appreciated by the student than formerly. The practical utility of chemical knowledge will become apparent, if we bear in mind the objects of chemistry, which are to inquire into the nature of all material substances, to determine accurately their compositions, to ascertain minutely the properties of all substances which enter into the composition of the rocks which form the solid part of the earth, of the water in which the latter may be said to be immersed, of the air by which the earth is surrounded, of the plants which vegetate, and animals which breath upon it; to study the changes which are continually going on in nature, to point out the laws which govern the same, and to determine the circumstances which

influence the mutual relation of substances to one another. A study so intimately connected with all other sciences necessarily must be of the greatest importance in relation to the arts of civilized life, which are all more or less founded on chemical principles.

It is a curious fact that such knowledge should have been so long neglected by the cultivator of the soil, whose occupations so eminently and constantly lead him to become an observer of nature's mysteries; and to whom chemistry is capable of rendering material assistance. It not only procures him the possibility of deriving from it innumerable immediate advantages, which without it would have been lost to him; but chemistry likewise teaches him the important art of making successful experiments, *i.e.*, to address definite questions to nature, upon which the decisive answer, "yes" or "no," and not "it is possible," or "it is probable" will be returned by nature, who is ever ready to satisfy the inquiring mind, provided the question has been distinctly put; and lastly, it secures him the intellectual enjoyment and satisfaction of having conducted the manifold cultural operations rationally, and to have become a witness of the wonderful, apparently complicated, but nevertheless most simple means, nature makes use of to accomplish her purposes.

However strange it may appear that agriculturists and gardeners should not have sooner become awakened to the important and manifold useful applications, to which the study of chemistry must lead, this fact will be less surprising if we recollect that the period since chemistry has ceased to be nothing more than a confused collection of mysterious and curious facts, comparatively speaking, is very short. More in particular organic chemistry, the rapid progress of which has given such an impetus to agricultural improvements, has been shaped into a somewhat scientific form only very recently; and it is chiefly through the labours of Berzelius, Liebig, and Mulder, chemists of our own age, to whom we are indebted for many important discoveries, that organic chemistry has received the character of a science, which it did not possess before; though we must confess, at the same time, that it is still in its infancy, and various facts remain to be discovered by natural philosophers, who have of late so successfully trod this path of inquiry, before organic chemistry can be properly called a methodical science.

Now, it may be laid down as an established rule, that no kind of knowledge can be accompanied by any extensive, useful applications, before the number of solitary, accumulated observations, and various facts admit of generalization, of being shaped into a definite, methodical science; and thus we can easily discern the reason why chemistry only lately has been so successfully applied to the purposes of culture, and, comparatively speaking, been neglected by the practical men of past times. In early times, when chemistry was unknown as a science, it returned no answer to questions of a practical kind; but at present how different is its position?—how many approved practices of culture find their explanation in the discoveries of modern chemistry?—how many improvements in cultivation have taken place, which owe their origin to the suggestions of chemists?—how many contradictory statements, by which practical men were puzzled and left in uncertainty on points affecting directly their own well-being, have been reconciled with each other by the help of chemistry? We would only direct attention to the works of Liebig in general: the ingenious and important theories concerning the growth and nutrition of plants, propounded in so clear a manner by Liebig, to his studies of the changes which organic substances undergo under different circumstances; and we will not leave unnoticed the researches of Professor Mulder, of Utrecht, on animal and vegetable physiology, and the writings of Professors Johnston in England, and Boussingault in France, who, happily in a position to test the results of the laboratory by practical experiments in the field, has likewise furnished us with a series of well-conducted, premeditated, agricultural experiments of the greatest value. How much have the labours of the above and other distinguished chemists contributed to a sound knowledge of the chemical composition of soils, without which the doctrine of manuring cannot be comprehended?—to a knowledge of the nature and composition of the various substances used as manures?—of the mode in which the latter act in producing changes in the soil, and in the plants which grow upon it?—of the best and most economical manner of compounding artificial, or improving natural manures, and skilfully applying them to the land?—and lastly, to a knowledge of the effects of climate, situation, and other influences upon the fertility of the land? We could easily point out many more instances, showing how our knowledge of a rational culture of the soil has been advanced during the last decenium by the researches of the analytical chemist; but this would be needless, as this subject has been discussed by different writers in so able and convincing a manner, that no intelligent and thinking mind will dispute any longer the usefulness of chemistry to the cultivator of the soil.

When we look back on what has been achieved by the aid of chemistry in this respect during the last ten years, we cannot but be struck with the mighty changes, which daily practices, where culture

is prosecuted as an advancing art, have undergone, especially through the agency of this rapidly-progressing science. But although much has been done by agricultural chemistry already, still infinitely more remains to be investigated. This new science may be said to be still in its infancy; and for that reason it ought not to assume the position of a matured, exact branch of science, like mathematics, when we are reasoning on detached observed facts connected with the nature of soils, and the doctrine of manures, or the nutrition of plants, as the case may be. How often do we not find chemists fall into the error of discussing an isolated fact in nature, and explaining its cause with as much assurance as if it were in harmony with the whole economy of nature, and the premises on which these deductions are founded as infallible as those on which a mathematical problem rests. This error, into which some chemists have fallen, has done a great deal of harm, and given a sudden check to agricultural chemistry in this country; because practical men, finding the high expectation which they were led to entertain by the exaggerated statements of some scientific men, not subsequently realized, declared themselves deceived, and instead of separating the good grain from the bad—well-authenticated facts from exaggerations, mere theories, and wild speculations—have discarded at once the aid of a science which is so pre-eminently calculated to benefit the cultivators of the soil. Who, then, is the more to blame—the practical man, whose previous ideas of chemistry did not allow him to form a right estimate of an exaggerated statement, or the scientific, or would-be scientific man, who is aware of his exaggerations, or ought to be acquainted with the real merits of the case, before he went forward as a teacher of others? Ought we to condemn this branch of natural science itself as useless or unprofitable, because administered by an uninformed or inexperienced empyric? Surely not: the blame rests on such professors, who, with a smattering of knowledge, combine a total disregard for practical experience; and with all the conceit and presumption of a charlatan, either out of self-esteem, or for the sake of selfish purposes, bombastically proclaim the new doctrine to the unsuspecting public. Charlatans, wild enthusiasts, and amateuring dilettants, may attract attention for a short time, but we may rest assured, sooner or later, they will bring down upon themselves disgrace, and discredit on the science which they profess.

True scientific knowledge on the contrary, submitted with modesty and caution, though slow in its action upon the mind of the public, convincing in the end, will be regarded as possessing greater value than even the most ingenious theories that can be propounded. But how is the practical man to decide between truth, established by well authenticated facts, and mere theories, without a knowledge of the science and the properties and composition of those substances which come daily under his notice?

To the husbandman and the gardener it is a matter of importance to be acquainted with the properties of those substances which enter into the composition of the different soils; the soil is the first care of the gardener. Upon it he grows plants, the leaves or roots of which serve as food, or the fruits of which refresh us; or plants which delight us by the beauty of their flowers and fragrance of their scent, or which, as groups of trees and shrubs, produce an agreeable impression on the mind of the lover of beauty and harmony. All the different kinds of plants are *regulated* by the soil; the nature of the soil and the growth of plants are, therefore, intimately connected. A knowledge of the composition of the different classes of soils, the relation of their constituent parts to the plants which are intended to be cultivated, will enable the husbandman to change the constitution of the soil by mixing together soils of opposite characters, or by adding other less compound substances, in such proportions that he shall obtain a mixed soil, or one which shall contain the constituent parts in exactly the relation which experience has proved to be most conducive to the production of leaves or flowers, or fruits, or to the formation of wood.

Intimately connected with the chemistry of the soil, is the chemistry of the substances by which the fertility of the soil is restored. Without a knowledge of the properties of the materials which enter into the composition of the different soils and the requirements of the plants, an improved practice of manuring is impossible. The doctrine of the application of manures to the land, further, will not be intelligible without a knowledge of the composition of the different manures, and the properties of the substances upon which their chief fertilizing powers depend, and the circumstances by which the latter may be preserved or increased. We, therefore, purpose to give, in a series of papers, the chemistry of manures, after we shall have first discussed in detail, the origin, composition, physical and chemical characters of different classes of soils; and shall then endeavour to show how the different manures may be applied in the most economic and best manner to maintain or to increase the fertility of any particular soil.

ROYAL BOTANIC SOCIETY'S MAY EXHIBITION.

THE first of the annual series of exhibitions under the auspices of this Society took place on Wednesday May 8th, in their gardens—the Inner Circle, Regent's Park; and, though the display for the season was a remarkably good one, the elements waged war against it; and, ushered in by something like forty-eight hours' continuous rain, which scarcely ever ceased throughout the day, but very few of the thousands of patrons of horticulture dared venture to see it. More, however, than could have been expected, were present, and among them we noticed some of the leading patrons of gardening. The garden was in beautiful order, clean and neat, and the conservatory was gay with a number of baskets of flowers and specimen plants, the former very tastefully arranged and looking remarkably well. In the arrangements a very appropriate alteration had been made in the tent near the American garden. The surface of the ground in that part is slightly undulating, and advantage had been taken of that, to attempt something like a natural and at the same time artistic arrangement of the plants. Instead of the usual stages covered with green baize, the interior of the tent has been laid out in circles and segments of circles, and upon each a mound of earth has been raised, and then cut into graduated terraces, with neatly turfed banks, and sanded borders for the plants to stand upon. Thus much of the artificial appearance of the ordinary tent is got rid of, and the effect of the arrangement is cool, quiet, natural, and interesting.

Upon the centre bed in this tent the large collections of stove and greenhouse plants were placed; one from the garden of Mrs. Lawrence at Ealing Park, and a second from Mr. Colyer's garden at Dartford. Mrs. Lawrence's plants were, *par excellence*, gems of the first water—such a group was never before brought together—so fine, that language is inadequate to do justice to them;—they must be seen to be appreciated, and such a sight is worth a journey from the antipodes to behold. Each plant was a specimen, perfect of its kind, and some of them of such huge dimensions for the kinds, as almost to subject one to a charge of exaggeration in attempting to specify them. Annexed is an engraving of a very lovely plant of Gompholobium barbigerum, not so remarkable for size, as for the very admirable manner in which it has been induced, under the care of Mr. May, to produce its chaste, clear yellow, pea-like flowers. When introduced a few years back, this plant was considered unworthy of cultivation; but here we have a specimen which shows that the plant, though the flowers unfortunately are of a rather ephemeral character, is of first-rate excellence. The noble plants of Eriostemon buxifolium, Epacris grandiflora, Polygala acuminata, Podolobium staurophyllum, and chorozemifolium, Leschenaultia formosa, and biloba major were skilful exemplifications of first-class cultivation, as were also two specimens of Pimelea spectabilis. These, with the huge single specimen of the Pimelea, which we shall represent on a future occasion, and a collection of ten Indian Azaleas, all from Mrs. Lawrence's, were the gems of the exhibition; and we may safely assert, forty such plants were never before produced from one garden, and it is doubtful if the combined efforts of the whole of the exhibitors could have produced an equal, not to say a superior lot. We make this remark without any wish to disparage the productions of other exhibitors, but Mrs. Lawrence devotes her whole attention to one subject—exhibition plants;—her gardeners have superior facilities for producing them, and she has a right to hold the position she now occupies. The most remarkable plants in Mr. Cole's group were a very admirably

GOMPHOLOBIUM BARDIGERUM: exhibited by Mrs. Lawrence.

bloomed specimen, trained upon a cylindrical trellis, of Clerodendron splendens, loaded with splendid clusters of its brilliant orange scarlet flowers; this, in September, the natural blooming season of the plant, would have been fine, but on the 8th May it was pre-eminently so. Two charming plants of Aphelexis spectabilis grandiflora were also there, and a large specimen of Stephanotis floribunda also promised to be very fine. In Mr. Green's group we noticed a plant rarely seen of Acrophyllum venosum, and a remarkably well bloomed specimen of Leschenaultia formosa. Mr. Taylor had a very promising plant of Eriostemon buxifolium, and a very nicely bloomed example of Erica Albertus, a creamy yellow heath, but little known. In the smaller groups, Mr. Croxford, gardener to H. H. Barnes, Esq., produced some promising plants, especially Epacris grandiflora, Chorozema Henchmanni and Leschenaultia biloba major, all admirably bloomed. Mr. Laybank, gardener to T. Mandsley, Esq., had a remarkably fine Tropæolum tricolor, Erica Batemanniana, a very charming variety, and Chorozema angustifolia. Messrs. Fraser's group contained a remarkably high coloured Erica propendens, and Mr. Daniels had E. Sindryana beautifully bloomed.

HOYA IMPERIALIS: exhibited by Messrs Lucombe & Pince.

Single specimen plants were less numerous, and, with one or two exceptions, less meritorious than usual. The noble specimen of Pimelea spectabilis, previously named, and a monstrous plant of Dendrobium cœrulescens, from the nursery of Messrs. Lucombe Pince & Co., were the most remarkable. The Dendrobe was upwards of four feet in height, and quite as much in diameter, and was a mass of flowers from the pot to the extremity of its numerous pseudo-branches. The same gentlemen also sent a noble plant of Hoya imperialis, in fine condition. It was trained upon a pyramidal trellis and was producing, and promised to produce for some time to come a fine display of its large and singular flowers. With it was a nice specimen of the singular Erica brunioides. From Messrs. Veitch was a well bloomed specimen of Boronia spathulata, and, though pretty, we doubt whether it will come much into cultivation. Messrs. Rollisson had a noble specimen of Epacris miniata, and from Messrs. Henderson, of Pine Apple Place, we noticed a very lovely plant of Adenandra fragraus. Messrs. Lane and Son, of Great Berkhampstead, sent a very finely bloomed specimen of Rhododendron formosum, or Gibsoni, which is not improved at all by the slight colour it attains when bloomed at its natural season.

New Plants were scarce, but Messrs. Lucombe Pince & Co. sent a nice specimen of Gardenia malleifera, or Whitfieldii which proves to be a fine thing, the flowers being large, and produced in considerable abundance; they are bell-shaped, and of a rich cream colour. With this plant, from the same firm, was Clerodendron Bethuianum, with one panicle of flowers, but bearing evidence of being out of season, and not doing justice to this very beautiful species. Messrs. Veitch sent their Medinilla bracteata, noticed at page 167, the flowers much deeper in colour than when we then saw them, but still, in our opinion, not improved thereby. For a stove conservatory, where it can be allowed free scope, this will be a noble plant, but the foliage, though fine, is too coarse to render it a desirable pot plant. With it was Fuchsia spectabilis, a lovely flower, but too shy in producing them to become a general favourite. Messrs. Veitch had also Dendrobium cretaceum, white veined in the throat with pale purple; Dendrobium, a species from the centre of India, a very pretty small flowered kind, in the way of nobile, with a rich violetp-urple throat; Saccolabium miniatum, a dull orange-red species, not very attractive; and with these was a very pretty New Holland plant, Stylidium ciliare. Messrs. Rollisson sent Cypripedium Lowii, a fine species; and Messrs. Henderson, a very nice Acacia, called Grandis, which may be classed as one of the very best of the late kinds. Mr. Taylor had Pimelea Neippergiana, a pretty white species, and Dillwynia Henchmanni. Messrs. Lucombe Pince and Co. sent also Fagus antarctica, the ever-

green antarctic beech, with Thuja orientalis glauca, a very promising kind, and a very broad-leaved variety of Quercus Ilex. From the same place we also noticed some remarkably fine seedling Heaths, apparently crosses with aristata, Sprengelii, Massoni, ferruginea and some of the more difficult of the hard wooded kinds; among which, E. Hanburyana, cinnabarina, Barnesii, and Ruckerii received prizes; and with these was a fine Azalea indica, of pure white colour and good form, called Vesta, and a Rhododendron, called Bianca, blooming in a four-inch pot. A plant, not for competition, was also placed upon the table from Mr. Stark, nurseryman, of Edinburgh, a *violet-scented* yellow Cheiranthus, called Marshallii, a plant of considerable promise, producing flowers of fine form and good substance, which we hope to figure very shortly. Other new plants were present, but none calling for special remark.

Heaths were plentiful, and some of remarkable excellence. The greatest novelty was Erica viridis, in the collections of Messrs. Rollisson, and W. Quilter, Esq. It is a green-coloured species, of the vestita group, and apparently of free growth, though it has not been seen about London for a number of years past. Mr. Leach, gardener to S. Rucker, Esq., had a noble group, among which E. elegans, metulæflora, tortiliflora (true), mutabilis, and aristata major, were specially remarkable. The subjoined engraving represents E. vasæflora, perhaps the finest plant in England, profusely studded with its gay pink, vase-like flowers. Messrs. Veitch sent a noble plant of E. metulæflora, with tricolor verna, a great improvement upon eximia; and a good plant of tortiliflora. Messrs. Fairbairn had good plants of mutabilis, Sindryana, finely coloured, and suaveolens.

ERICA VASÆFLORA: exhibited by S. Rucker, Esq.

Of Azaleas a noble bank of gorgeous plants extended the whole length of one of the long tents, and though the whole were fine, Mrs. Lawrence's plants were pre-eminently so; and when we say that six large vans were required to convey the twelve plants, some idea may be formed of their size. They were dense bushes of the finest kinds, sheeted with bloom, but trained without the formality which characterized some of the collections. Messrs. Fraser had a noble, but too formal group, and Mr. Green and Mr. Falconer had also some fine plants. Smaller plants were sent by Messrs. Lane and Mr. Daniels.

The Orchids, as was to be expected on such a day, were not numerous. The most remarkable plant was perhaps Mr. Dobson's Dendrobium nobile, which was scarcely inferior to Messrs. Lucombe & Co.'s plant, before-mentioned. With it was a finely bloomed and coloured plant of Cattleya Skinneri, with Burlingtonia rigida, and Dendrobium fimbriatum, and speciosum. Mr. Schroder sent a nice mass of Dendrobium densiflorum and pulchellum, with Vanda cristata. In Mrs. Lawrence's group, we noticed Vanda insignis, and Dendrobium formosum; and Mr. Williams, gardener to C. B. Warner, Esq., had fine plants of Dendrobium macrophyllum and densiflorum, Saccolabium miniatum, Cattleya Skinneri, rather pale, with C. Mossiæ, and Cypripedium barbatum.

The Pelargoniums, with two or three exceptions, were good; but when we say that Mr. Cock, of Chiswick, eclipsed himself, it may be inferred that he sent the finest group which even *he* ever produced. The plants were clean as a new pin, with splendid foliage, and noble trusses of flowers regularly distributed over the entire plant. What rendered them more meritorious was, that this perfection was obtained almost without a stake being seen, and the plants wore a natural character, much, as a matter of taste, to be approved. As compared with these, Mr. Beck's stand, though

containing superior kinds, were more artificial (we wish we could say, for the sake of taste, artistic) creations. Many of the pots contained a coppice-wood of stakes, almost every truss of flowers being supported; in fact, the style of growth and character of plant, of the two collections, were as extreme as they possibly could be. Mr. Parker showed with his usual success, his plants being little inferior to Mr. Cock's. Of fancy Pelargoniums, Mr. Robinson had a magnificent group, rather too formally trained, but still exemplifying very superior management. Some fine seedling Pelargoniums were exhibited by Mr. Hoyle and Mr. Beck; but the raisers seem so intent upon breeding high-colored varieties, that, in a few years, a light flower will be as great a novelty as the sea serpent; indeed, we were strongly reminded of an anecdote we heard, a short time back, of a gentlemen, who, after viewing a collection containing most of the leading kinds, remarked, "I say, ——, I wonder you don't grow more than one sort; I grow a few Geraniums, but I have got five or six colours." And so it is with all ordinary observers: so much attention has been paid to high-colored kinds, that the seedlings of late years, though improved in form, are nearly of the same colour. Mr. Parker sent a collection of fourteen kinds of Cape Geraniums, in fine condition.

Roses in pots were fine and good, the collections of Messrs. Lane, Paul and Son, and Mr. Francis, especially so. Messrs. Paul's group was the most natural in appearance, though deficient in colour; and Mr. Terry, Mr. Roser, and A. Rowland, Esq., produced some fine groups. The more remarkable kinds were Souvenir de Malmaison, William Jesse, Paul Perras, Aubernon, Mrs. Bosanquet, Grand Capitaine, Duchess of Sutherland, Triptolème, Madame de St. Joseph, Lady Warrender, Abbe Mioland, Lamarque, Safrano, Geant de Batailles, Chenedole, Vicompte de Cazes, Smith's Yellow, Solfaterre, Pauline Plantier, Vicomptesse de Cazes, Moire, La Pactole, Paul Plantier, Princess Adelaide, and Clara Wendell.

Several groups of Ferns were exhibited. Florists' Flowers will be noticed in detail at the end of the month.

Preparation, we observed, had been made for the exhibition of American plants, and, from the very promising appearance of the plants, we anticipate a very superior display. The arrangement is very judicious; and when the plants are in perfection, we shall avail ourselves of a sketch of some of the leading features for engraving. At the June exhibition, fruit will form a feature, and no doubt an interesting one.—A.

A NOTE ON WATERING POTTED PLANTS.

IN the operation of watering potted plants, persons not practically familiar with plant culture are apt to make serious mistakes. Cultivators find, by experience, that an excess of water at the roots is very injurious to almost all plants; and hence it is usual to direct that great caution be used in the application of water, especially in winter. The result is, that frequently the opposite extreme is fallen into, to the great injury of the plants. From the moment that the soil becomes so far dried that the fibres of the roots cannot absorb moisture from it, the supply of the plant's food is cut off, and it *begins* to suffer. Some plants can bear this loss of water with more impunity than others; some again, and the Heath family among the rest, are in this way soon destroyed. The object in watering should be to prevent this stage of dryness being reached, at least during the time a plant is growing, and at all times in the case of those of very rigid structure; at the same time that excess, which would sodden the soil and gorge the plants, is also avoided. Within these limits the most inexperienced persons may follow sound directions for the application of water with safety. But whenever water is given to pot plants, enough should be employed to wet the soil thoroughly; and the difference between plants that require less or more water should be made by watering *more or less frequently*, and *not by giving greater or less quantities* at one time.—E. R.

Sacred Botany.—The Plane Tree.

THE devout reader of the canonical Scriptures, acquainted only with the authorized version, will hardly be prepared to admit that the Plane tree is registered in its sacred pages; and yet, the learned in these matters have decided that it is so. The Hebrew word so explained is *armon*, for which our translation reads "Chesnut trees," in two distinct passages. One argument in favour of the Plane tree being that referred to, has by some—Rosenmuller, Kitto, and Calleott, among others—been drawn from the connection in which the word *armon* is found:—"And Jacob took him rods of green Poplar, and of the Hazel, and Chesnut (Plane) tree. . . . And he set the rods . . in the watering-troughs" (Genesis xxx. 37). The word here translated "hazel" is *luz*, which, according to the views of those who argue thus, is the "willow;" and it is hence inferred that there is an appropriateness and congruity in the connection, all the three kinds of trees mentioned affecting the like kinds of damp situations.

Russell expressly mentions the Plane, Poplar, and Willow, as observed growing together with the Ash, in the same kind of low humid localities near Aleppo. But there is, after all, some incongruity in this view: *luz* is universally admitted, even by the authors above-cited, to be one of the names of the almond—a tree not met with in low damp localities, but rather flourishing in dry situations; and besides, the willow has other Hebrew appellations, as *arab*, and *zaphzaphah*, the proper application of which terms to the Willow seems beyond doubt. We must therefore abandon this point as evidence in favour of the Plane tree. That it is the tree referred to in the text is, however, supported by the most ancient Greek translation, as well as the Latin, the Syriac, the Chaldee, and the Arabic.

The other passage in which the word *armon* occurs is in a figurative description of the glory of Assyria: "His root was by great waters. The Cedars in the garden of God could not hide him; the Fir trees were not like his boughs, and the Chesnut (Plane) trees were not like his branches; nor any tree in the garden of God was like unto him in his beauty" (Ezekiel xxxi. 7, 8). This is especially applicable to the Oriental Plane, than which there are few trees more stately and beautifully expressive in character, even when transferred to our northern latitudes. Assyria is remarkable for the size and extraordinary beauty of its Chenar (Plane) groves; and Palestine, Syria, and Asia Minor still abound with them.

PLATANUS ORIENTAL'S ACERIFOLIA.

The Plane tree is again mentioned in the Apocrypha, in a passage wherein "wisdome doeth shew her glory," as follows:—"I was exalted like a Cedar in Lebanon; . . . and grew up as a Plane tree by the water" (Eccles. xxiv. 13, 14), a figurative expression well according with the noble bearing of the tree.

The Oriental Plane (*Platanus orientalis*) is a tree of Western Asia, extending, according to Royle, as far eastward as Cashmere. It forms a stately tree, seventy or eighty feet or upwards in height, with a massive trunk, from which, when planted in congenial situations, the huge branches grow up to an enormous size, and spread wide in all directions. The trunk and branches are clothed with smooth light-coloured bark which scales off annually in broad irregular patches, giving the tree a singularly speckled appearance when bare of its foliage. This scaling off of the bark is said to be occasioned by the rigidity of its tissue, incapable of stretching as the wood beneath increases in diameter. It is a very rapid growing tree, and lives to a great age. The timber is useful for a variety of purposes. The foliage is ample, well adapted for shade, and hence it must have been peculiarly valued in the warm climate of the East. The leaves are palmate, divided into five lanceolate

sinuated lobes; they are smooth on the upper surface, and of a bright shining green. The flowers, which are small and inconspicuous, grow in globular catkins, dangling on longish stalks from the buds of the smaller spray; and in winter, when the trees are leafless, these perpendicular threads give them a very singular appearance.

It is remarked by the old authors that no tree whatsoever defends us so well from the heat of the sun in summer, or admits it more kindly in winter. Both these properties, Loudon remarks, result from the large size of its leaves; in summer they present horizontal imbricated masses, which, while favourable to the passage of the breeze, yet exclude both the sun and rain; while, as the distance at which the branches and twigs of trees are from each other is proportioned to the size of the leaves, the bare spray is hence more than usually open, thus admitting the sun's rays.

The tree is peculiarly adapted for pleasure-grounds from its expression of gentleness and repose; its grateful shade in summer, and its sun-admitting character in winter. As an ornamental object, it is said by Loudon to present a combination of majesty and gracefulness, an expression produced by the massive and yet open character of its head, the bending of its branches, and their feathering to the ground. Where it is allowed to grow with ample space around, the lower branches usually extend themselves to a considerable distance in a somewhat horizontal direction, then curve gracefully toward the ground, and turn upwards at the points, the upper branches assuming a similar mode of growth. Though vigorous in its growth, the Plane tree is easily injured by cold, and often, during the cold winds of spring, the foliage may be seen to bear a scorched and blackened appearance. But though the foliage is tender, the tree is by no means deficient in a certain picturesque outline. Its young spray grows in a zig-zag manner, which, though filling up every space with verdure, yet, on account of the irregular distribution and disposition of the branches, exhibits more or less those masses of light and shade, which are the elements of picturesque effect.

One particular in connection with the Plane tree must not be omitted. It seems to withstand the smoke and confined air of towns and cities better than almost any other tree, thriving in situations surrounded by buildings, and where it must be constantly exposed to the murky sooty atmosphere which destroys outright its hundreds of less enduring subjects. Hence it becomes a very desirable tree for groups or avenues, or other sylvan compositions, in the parks and pleasure-grounds now springing up in the suburbs of most populous towns and cities.—M.

GREENHOUSE ARCHITECTURE—A HINT.

MUCH yet remains to be realised in the erection of houses for the cultivation of plants, not only as regards their number and dimensions, but also their arrangement and details. We seldom see more than the same kind of flat lean-to, or span roofs, the same kind of formal stages, when the plants are grown in pots, and the same kind of formal beds when the latter are planted out in borders of prepared soil.

Some improvement of the exterior has resulted from the partial adoption of what is called the ridge and furrow style of roof, which style admits of being so arranged as to produce a very ornamental effect. But, even as now generally applied, this style of building leaves the interior unchanged; and the same mode of disposing of the plants is in most cases followed. This ought not to be. Our gardens would lose half their charms were we to see the same state of things imaged everywhere; it is, in fact, as much in the endless variety of which the arrangements of a garden are susceptible, as in their intrinsic beauty that their fascinations rest. And why should it not also be so with the erections for the growth of exotic vegetation? Why should we not in these have groves and lakes, flower parterres and rockeries, and caverns, adorned with their appropriate vegetation? There is no material difficulty in the accomplishment of such an object. What a degree of interest, too, would attach to gardens of tender Roses, or Rhododendrons not capable of bearing our climate; of Heaths, and a thousand other subjects, disposed with a view to artistic effect, and merely shielded from the vicissitudes of our climate by a covering of glass.

The plants to which allusion has just been made would form very striking, and no less interesting groups, if arranged with reference to their ultimate effect; but a class of plants more specially suited for the natural or picturesque mode of arrangement recommended for adoption, is the Ferns. For picturesque effect, no other group of vegetation is at all comparable with these. Next to them stand the Orchids; and perhaps the most interesting spectacle of all would be obtained by a combination of Ferns with Orchids. Of course, if either exotic Ferns or Orchids are employed, a congenial temperature must be kept up for them.—M.

Pear Insects.

PEAR INSECTS.

I.—THE WOOD LEOPARD MOTH. Female.

ZEUZERA ÆSCULI, *Latreille*. (PHALÆNA NOCTUA ÆSCULI, *Linnæus*, Syst. Nat., ii., 833. PHALÆNA NOCTUA PYRINA, *Linnæus*, Faun. Suec.)

Fig. 1 represents the female Moth of the natural size; 1*a* the Caterpillar within the burrow which it forms in trees; 1*b* the mass of vegetable detritus which it leaves behind it, and of which it forms its cocoon; 1*c*, the pupa, or rather the cast skin or pupa case, from which the perfect insect has escaped.

II.—THE PEAR PSYLLA. Female.

PSYLLA PYRI, *Stephens*, Catalogue of British Insects, Haust., p. 360. (CHERMES PYRI, *Linnæus*, Syst. Nat., ii., 737.) Greatly magnified.

III.—THE SLIMY GRUB OF THE PEAR TENTHREDO.

SELANDRIA ÆTHIOPS, *Fabricius*, Ent. Syst., ii., 121. (Tenthredo cerasi, *Linnæus*.)

Fig. 3, the perfect insect magnified; 3*a*, two of its larvæ of the natural size, covered with the black slime; 3*b*, one of its larvæ cleared of the slime; 3*c*, the cast skin of one of these larvæ; 3*d*, the cocoon of particles of earth, within which the insect undergoes its transformations.

IV.—THE PEAR LEAF MINER.

ARGYROMYGES SCITELLA. (OPOSTEGA SCIT., *Mentz.*, in Isis, 1839, p. 214. ARGYROMYGES CLERCKELLA, *Stephens*, *Curtis*, *Knight*, *&c.*, but not of *Linnæus*.)*

Fig. 4 represents the perfect insect much magnified; 4*b*, portion of a pear leaf with three blotches, caused by the mining of the Caterpillar; 4*b*, the Caterpillar with one of the blisters opened.

V.—THE NARROW-WINGED RED BAR MOTH. Female.

PÆDISCA ANGUSTIORANA, *Haworth*. (TORTRIX A. *Stephens*. DITULA A. TORTRIX ROTUNDANA, *Haworth*.) Variety of male with the tip of the wing injured and rounded.

Fig. 5 represents the female magnified; 5*a* part of a pear with the dried calyx removed, shewing the larva of the natural size.

THE diseases produced by the attacks of insects upon plants may be classed into genera and species or varieties, keeping up the mode of classification which has been employed with respect to diseases of the higher animals, and also of plants themselves. In our article upon Rose Insects (*ante* p. 193), these diseases consisted of the destruction of the pollen-bearing organs of the plant, the consumption of the full-grown leaves, as well as of the embryo leaves or buds; and lastly, the abnormal growth of some portion of the plant by the formation of galls.

In our present plate, illustrating the natural history of some of the species of insects which attack the Pear, other classes of diseases are exhibited—namely, the destruction of the plant by burrowing into the solid wood of its stem or branches; three varieties of injuries inflicted upon the leaves of the tree, by the removal either of their solid or fluid portions, namely, first, by the upper cuticle being gnawed off in patches; secondly, by the parenchyma or fleshy inner matter of the leaf being eaten, its two surfaces remaining uninjured, thus causing blister-like blotches on the leaves; thirdly, by the weakening of the leaves, their fluids being absorbed by the puncture and suction of numerous minute insects; and lastly, injury to the fruit itself, by the rind and flesh being partially eaten by an insect. The first of these different kinds of injuries is produced by

Fig. I. ZEUZERA ÆSCULI.—This beautiful insect belongs to the order Lepidoptera; section, Nocturna (or Moths); and family, Hepialidæ. The male is smaller than the female, which is here figured; and the former is at once distinguished by its antennæ, of which the basal half is feathered on each side; those of the female being simple, although woolly at the base; specimens vary from rather more than two to nearly three inches in the expansion of the fore-wings, which are of a snowy white colour, semi-transparent, and marked with a great number of shining blue black, or greenish black spots (which are more distinct in the males than in the females); these spots are much more indistinct in the hind wings. The thorax is white and woolly, with six blue black spots. The caterpillar is yellow-coloured, with a large black scaly patch on the segment following the head, and with a number of shining black dots bearing short hairs; the terminal joint of the body has also a black patch on the upper side. The female Moth is furnished with an elongate telescope-like ovipositor, capable of great elongation (represented as partially protruded in our Fig. I.), with which she is enabled to deposit her eggs at a considerable depth in the crevices of the bark of trees, especially the Pear and Apple (whence the specific name, *Pyrena*, originally proposed for it by Linnæus), Elm, Walnut, and far more rarely the Horse Chesnut (whence the impropriety of the generally received specific name of Æsculi). The perfect insect appears about the beginning of July, and the caterpillars are hatched in August, when they immediately burrow into the wood of the tree. In the following month they undergo their first moulting, and they are full grown in the following June; so that, according to Kollar, the duration of life in this species does not extend beyond a year, whereas in several other wood-boring insects it extends to two or three years (as indeed the Wood Leopard is also stated to do by some writers). They form burrows of considerable size in the solid wood of the trees, making a cocoon for their transformation, composed of minute particles of gnawed wood. The chrysalis (Fig. 1*c*) has the

* On examining the Linnæan Cabinet, I find that the Tinea Clerckella is nearly twice the size of, and quite distinct from, the insect here figured by me, known to most collectors under that name.

body elongate and cylindrical, the segments of the abdomen furnished with transverse rows of minute points directed backwards, whereby the insect is enabled to push itself forward, when ready to assume the perfect state. The head is also armed with a short hard point, which serves to force a way through the cocoon. Our figure 1*c* represents a chrysalis case from which the Moth has effected its escape by a slit down the anterior part of the upper side of the body, and by the head-piece becoming detached.

The conspicuous appearance of the perfect Moth renders its capture comparatively easy; indeed, the sparrows are here our best allies, as it is (or at least a few years ago was) no uncommon thing to find numbers of wings of this insect at the foot of the trees in St. James's Park, the bodies having been devoured by the sparrows.

Fig. II. PSYLLA PYRI.—This very minute insect is very similar in its habits, as it is also closely allied, to the family of the Plant-lice, or Aphides. It belongs to the order Homoptera (or those suctorial insects, which have the four wings of a similar consistence), and family Psyllidæ. The perfect insect measures nearly a quarter of an inch in the expansion of its fore wings. The head and thorax are of a greenish yellow or orange-colour, much varied with black markings, and the abdomen is black, with light margins to the segments; the antennæ and legs are buff-coloured, the former black at the tip, and the latter with the thighs broadly black at the base. The wings are stained pale yellowish brown, with a black patch on the inner margin of the fore ones. Its legs are formed for leaping, so that it is difficult to secure it. It is found in considerable numbers, both in the perfect and imperfect states, upon the leaves of the Pear, as well as upon the young shoots and bearing wood, which it injures by sucking their juices, and defiles all over with its excrement. The mouth, or rather the instrument of suction, is a short, jointed proboscis, situated at the hind part of the underside of the head, almost in the breast; it is extended perpendicularly from the body, and is terminated by a sharp point, and encloses several very delicate setæ, or bristles, which are protruded and withdrawn at will, and which are thrust into the wound made by the sucker itself. Köllar states, that as soon as the fruit trees put out buds, the winged Psyllæ make their appearance. When pairing is over, the female lays her eggs in great numbers, near each other, on the young leaves and blossoms, or the newly formed fruit and shoots. They are of a longish shape, and yellow, and without a magnifying glass, resemble the pollen of flowers. They are hatched in a few days, and somewhat resemble the wingless plant-lice, having six feet, two antennæ, and are of a dark yellow colour; they are, however, much flatter. They possess an instrument of suction similar to that of the perfect insect, and continue active throughout their whole life (not undergoing an inactive chrysalis state, like butterflies and moths); they cast their skin several times, and the pupæ resemble the larvæ, except that they have broad flat cases at the sides of the body, within which the future wings are developed. The excrement these insects discharge is of a saccharine nature, like that emitted by the Aphides, and the Ants are equally fond of it. When the young insects have attained their full growth as pupæ, the body gradually assumes a cylindrical form, the skin slits down the back, and the winged insect crawls forth, pale in colour, and weak, but in a few days it assumes the rich colours of the species, and, living through the summer, it seeks some sheltered spot in the autumn, in which it passes the winter.

The presence of these insects on a Pear tree, more particularly on young plants, is indicated by its unhealthy appearance, the leaves and shoots curling up, as well as by the presence of great numbers of Ants, which come to feast on the secretion of the insects. By repeatedly syringing the leaves and stems with tobacco or lime water, or, better still, with gas-tar water, the young larvæ may be destroyed, but the plants ought to be searched over in May, and the winged parents destroyed before they have deposited their eggs, and the work of destruction has commenced.

Fig. III. SELANDRIA ÆTHIOPS.—This insect belongs to the order Hymenoptera, and family of the Saw-flies (Tenthredinidæ), and is remarkable for the habits which its larva possesses of covering itself with a black, slimy, strongly scented secretion, giving the insects the appearance of small black slugs,* and by eating only the upper surface of the leaf, leaving the parenchyma, or inner substance, as well as the lower cuticle of the leaf untouched. I have, from time to time, received complaints of the injury committed by this species, from correspondents, one of whom described the appearance of a tree attacked by the larvæ, as having a very bad rusty appearance, the leaves prematurely dropping off. It is in the months of July, August, and September, that these insects are found in the larva state.

The perfect insect makes its appearance in June, and is of a shining black glossy colour; the wings

* In America, indeed, one of the species of this genus, having similar habits, is known under the name of the Slug-worm, and towards the close of the last century it became so prevalent as to threaten the destruction of the Cherry, Pear, Quince, and Plum, all of which trees were infested with it, the small trees being covered with insects, and a breeze of air through those on which they abounded becoming charged with a very disagreeable and sickening odour. Twenty or thirty were to be seen on a single leaf, and many trees, being quite stripped, were obliged to put forth fresh foliage, thus anticipating the supply of the succeeding year, and cutting off the prospect of fruit. (W. D. Peck, *Natural History of the Slug-worm*, Boston, U. S., 1799.)

sooty, with the veins, fore margin, and stigma, black; the legs are dusky black, varied with yellowish. It measures about one fifth of a line in length, and from five to five and a-half lines in the expansion of the fore wings. The eggs of this insect have not been observed. The larvæ, when full grown, are nearly half an inch long, with the body rather thickened towards the head, the anterior segments being capable of inflation over the head, so that the insect, whilst feeding, somewhat resembles a minute tadpole. It casts its skin several times, immediately after which it appears of a fleshy consistence, and with a transversely wrinkled surface. It is furnished with ten pairs of legs, the extremity of the body not being provided with a pair, as are the caterpillars of moths. It soon covers itself again with the viscid matter above mentioned, which is of a peculiar nature, as it does not dry when exposed to the hottest sun, and which appears to exude from the articulations of the body, since, on rubbing it off, the insect swells itself out at the joints, and shortly afterwards a fresh secretion is seen to take place. After casting its penultimate larva skin, the power of secreting this liquid appears to be lost, and the body assumes a clay colour. When full grown, the larvæ fall to the ground, in which they bury themselves, and there form small oval cases, covered with particles of earth, within which they pass the winter, and undergo their transformations. Notwithstanding the observations of Mr. J. Fox to the contrary, I would recommend repeated powdering the leaves with quick lime, as originally proposed by Mr. Major. Probably syringing the leaves with gas-tar water would be still more efficacious.

Fig. IV. ARGYROMYGES SCITELLA.—This beautiful little insect belongs to the order Lepidoptera, and family Tineidæ. It measures about a quarter of an inch in the expansion of the fore wings, which are of a glossy silvery white colour, the terminal portion being orange with white fringe, but varied on the fore margin near the tip with two white triangular spots, edged with black lines, and with a trident-like black mark at the tip, and with the inner margin terminated by a black spot glossed with purple; the hind wings are silvery white, with long fringe. The history of this species, (under the name of Tinea Clerckella), was first made known by the late Mr. Knight, in the *Horticultural Transactions*. The perfect insect generally appears at the end of May, when the female deposits her eggs on the under surface of the leaves, the young larvæ penetrating the under cuticle, and feeding on the parenchyma, leaving the two surfaces of the leaf untouched, and thus forming large oval or rounded patches, several of which often unite together, and thus the greater part of the leaf assumes a blistered appearance. Mr. Johnson states that the Chaumontelle is especially subject to the attacks of this larva, as he had observed a standard tree of this variety annually attacked, whilst a Swan's Egg, and an Easter Bergamot in the immediate vicinity were comparatively untouched. It is at the beginning of the autumn that the leaves are observed to be most affected by the ravages of these larvæ, which are fleshy, yellowish-white, hairy, and with six pectoral, eight abdominal, and two anal feet depressed. When full grown the larva pierces the upper cuticle of the leaf, and comes into the open air, it then spins some longitudinal threads close together on the upper side of the leaf, and beneath these forms its cocoon, which Mr. Curtis describes as boat-shaped, with the keel upwards of a very close texture, and with a slit at each end, the cast off larva skin being thrust through one of these slits, and the Moth escaping by the other. Sometimes these insects abound to such an extent as seriously to affect the growth of the trees, and the size and flavour of the fruit; indeed, Mr. Knight's Pear trees were so much injured that he at one time resolved to remove them.

The chief remedy for preventing the mischief caused by this species seems to be the picking off the blistered leaves before the larvæ have left them, or by sharply pinching with the fingers the blistered parts, in the case of small and valuable trees. The collecting, also, of fallen leaves at the close of the autumn is serviceable, as the chrysalides will thus be destroyed, and the propagation of the species in the following spring prevented.

Fig. V. PÆDISCA ANGUSTIORANA.—This species belongs to the order Lepidoptera, and family Tortricidæ. It varies from 5 to 8 lines in the expanse of the fore wings, the males being the smallest and darker coloured than the females, the colours varying from dusky brown or blackish brown to brick red with darker patches and oblique clouds, and with a large pale oblique blotch on the fore margin beyond the middle. The male is similarly clouded, and marked with nearly black colour; the hind wings are uniform brown. It is a common species throughout the south of England; its larva feeding upon the leaves of various trees. Thus I have observed it especially injurious to the young shoots and leaves of the Apricot in my garden at Hammersmith, in the early spring; it also feeds on the buds of the Fir, as well as on Whitethorn, Oak, and Privet. My object, however, in introducing it into the present article is to notice its connection, at least occasionally with the Pear, as described by Messrs. Curtis and Graham, in the *Gardeners' Chronicle* of the present year. In the month of January the latter gentleman communicated two Pears to the former, the crowns of which had "a large brown patch surrounding the

calyx," with very fine delicate webs attached to the stamina and withered calyx, and extending to the margin of the spot; on cutting away the calyx the caterpillar was found, which had been concealed under the projecting margin, (as shewn in our figure 5*a*). Mr. Graham having placed one of the Pears in a tumbler glass, covering it with paper, the caterpillar spun up in one of the folds and changed to a pupa, from which the moth was hatched on the 7th June. Mr. Curtis added that the injury which this caterpillar does to the finest sorts of keeping pears rendered it desirable to find a remedy, which he suggested, was by searching for the Maggots in the eyes whenever any of the web, which is of the most delicate texture, is discoverable, and picking them out.

Such was the meagre history of the species published by Mr. Curtis, who supposed its economy to be unknown. No idea was given as to what extent the crop of Pears had been attacked, or, in fact, whether any actual injury had taken place; the mention of a "large brown patch," without any notion being afforded as to whether it was a bruise or a decaying portion caused by the attack of the insect upon the calyx, or actually the appearance produced by the gnawed part of the rind, being all that was stated by him. So much, in fact, was the account at variance with the habits of the species which I had twelve years ago recorded in the late Mr. Loudon's *Gardeners' Magazine* (vol. xiv.), that I addressed a note to the *Gardeners' Chronicle*, which had the effect of calling forth a detailed account of the facts from Mr. Graham himself. That Mr. Curtis (Ruricola) had, however, distinctly shown the extent to which the caterpillar had preyed on the rind, as Mr. Graham asserts, I must beg to deny, Mr. Curtis having merely spoken of a large brown patch round the eye, in the vague manner mentioned above. Mr. Graham, however, distinctly adds, that the caterpillar does feed on the rind of the Pear surrounding the calyx, into which convenient den he retires when his appetite is satisfied. He moreover states (in reply to my suggestion that this was merely an accidental adoption of winter quarters, which retreat, on the arrival of spring, would be quitted by the caterpillar, then ready to commence its attacks on the young leaves and buds of the Pear tree), that he had found dozens of them in the same caves during the last three years. Mr. Henry Doubleday, however, whose knowledge of the habits of our British Lepidoptera perhaps surpasses that of any living individual, in a subsequent note, published in the *Gardeners' Chronicle*, quite dissents from Mr. Graham's opinion, that the rind of the Pear is the common food of the larva. That it will eat it, he does not doubt; but he believes it to be purely accidental, owing, in fact, to the circumstance of the Pears being kept in a room where the temperature is of that height as to induce the caterpillars, which out of doors would be in a torpid state, to continue feeding during the winter, when, for lack of their proper food, the young buds and leaves of the spring, they feed on the rind of the Pear. Such is also my opinion.

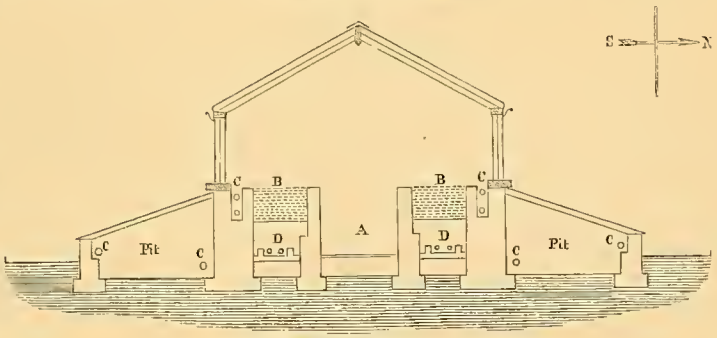
THE ECONOMICAL ARRANGEMENT OF FORCING AND PLANT HOUSES, &c.

IN these days of rigid economy, when persons of ample means delight to deal in the cheapest market, perhaps the following plans and suggestions for the economical arrangement of Plant Houses upon a small scale, may not be without interest to some of our amateur patrons; and even young gardeners and nurserymen may study them possibly with profit to themselves. The plans have been prepared not only with strict regard to economy of space—a matter of considerable importance in small gardens—but also so as to turn the whole of the materials to the greatest advantage, and that at, considering the permanence and durability of the erections, a very moderate cost. In the construction of horticultural as in all other buildings, there is no economy in "make-shifts;" the best materials and the best workmanship will ultimately be found the most economical, and those who save a few pounds by what is technically called "scamping a job," in the first erection, will generally find that they have been penny wise and pound foolish before the end of the first seven years. A range of houses on this plan has lately been erected for a gentleman. The forcing-house has yielded abundance of Roses and other forced flowers, with splendid Cucumbers, and at the present time a very fine crop of Melons is coming forward. These and the Cucumbers are grown in large pots plunged in leaf mould over the tank, and the roots are allowed to grow in the plunging materials. Under the Melons, &c., which are trained within a foot of the glass, plants for flower garden purposes are propagated, and a few stove plants, as Gloxinias, Achimenes, Gardenias, &c., are grown underneath. For the above purposes, or for the cultivation of a select collection of stove plants or Orchids, or even for the growth of the Pine apple, perhaps no better arrangement could be made, the command of heat, both for the plunging bed and the atmosphere, being of the most efficient description.

If the forcing house was devoted to the cultivation of Orchids, for which it is admirably adapted, we should build the inner walls on each side of the pathway in rock-work, and also place a mass of

rock-work the whole width of the house against the end wall, leaving niches to be filled with suitable material for the cultivation of some of the finer kinds of Ferns, Mosses, and such Orchids as are likely to succeed in such a situation. By merely opening a communication on each side from the tank and heating-apparatus, the rock-work might be supplied with any amount of moisture or bottom heat; and by simply placing a cistern of water above the level of the rock-work and over the boiler, silvery streams of warm water may be made to trickle over the tortuous track of the rock-work, finally refreshing the feelings, and ministering to the picturesque character of the scene, by terminating in a miniature waterfall, the grateful rippling of which will do much to cheat visitors into the belief that the house is not so warm as the proper cultivation of its occupants renders it necessary that it should be.

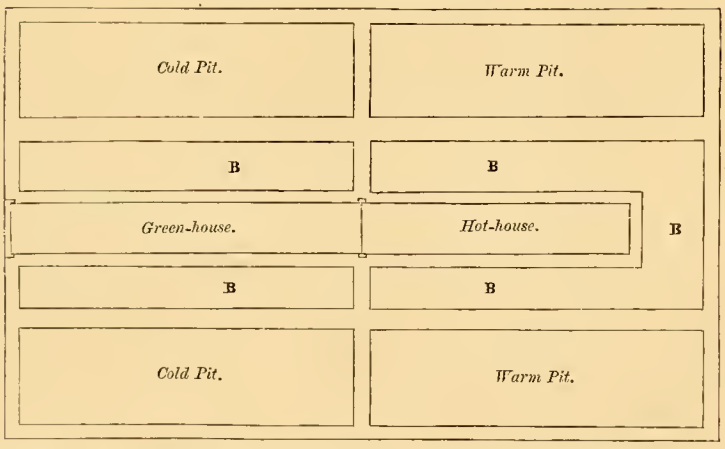
SECTION OF FORCING HOUSE.



REFERENCE TO PLAN.

A, *Pathway.*
B, *Bed for plants to stand upon, or be planted in.*
C, *Hot-water pipes 3-inch diameter in house, 2-inch in pits.*
D, *Hot-water tank for bottom heat, heated by two 2-inch pipes.*

GROUND PLAN OF HOUSES AND PITS.



"Oh! but," remarks some adept in the art and mystery of growing Orchids, "to do the various kinds justice, and produce them in perfection, two houses are required." Granted; therefore, if you please, we will confine the Indian kinds to the house we have been speaking of, and by continuing the same heating arrangements, we will convert the greenhouse into a house for the growth of those kinds which are natives of Mexico and colder climates; and thus, with one exception, which we shall point out another time, we have arrangements as complete as the most fastidious could desire, where light, heat, and moisture are at command, to do all that is required for the proper cultivation of this beautiful tribe of plants. Indeed, in the laconic language of one of the best gardeners in the country, these are "nice snug houses," suitable for plants of all kinds; and if Nature's journeyman, the gardener, only performs his part properly, success is certain.

For the cultivation of Vines in pots, such houses would be perfect; and one of these houses, with the side pits to bring on successional plants, would produce grapes sufficient for a small family, and that for several months in the year.

In the construction of this range of houses the position of the boiler is not indicated, but we propose to fix it at the north end of the forcing-house, to heat the tanks, house, and pits, independently of each other, having stop-cocks or valves to each set of pipes, so as to work the whole or a part at the same time, as may be necessary. The greenhouse will be heated by continuing the pipes from the forcing-house, placing stop-cocks where the pipes enter the greenhouse. The pipes for surface heat are placed in a trough lined with cement, so that in case of need, when a very moist heat is required, water may be placed around the lower pipe to create moisture. The pipe for surface heat must be three inches in diameter, and those running through the tank for bottom heat, two inches. For the

side pits, two-inch pipes will be sufficient for ordinary purposes; but if a strong heat is required, why then, three or four-inch pipes will be required. Of boilers, the old conical is as good as any for small houses; but for large, we have every reason to believe that the "patent flue boiler," invented by Hill, of Greenwich, is the best that can be used.

The cold pits adjoining the greenhouse will be found very useful for the growth of Mignonette, Violets, and Stocks through the winter, and also for protecting plants for the flower-garden. In the heated pits, Roses and other flowers may be forced, or, if preferred, Cucumbers may be grown. Should further information be required, or working plans and estimates, we shall be ready professionally to supply them.—A.

THE CULTURE OF STYLIDIUM FASCICULATUM.

By Mr. G. FREEMAN, Botanic Garden, Chelsea.

STYLIDIUM fasciculatum is one of the many interesting plants that should be more generally cultivated than it is, for the purpose of exhibition, it being a bushy dwarf growing plant, attaining to a foot in height, and when well managed, densely covered with delicate pinkish flowers, which remain in perfection for a considerable time. It is also a very desirable plant in small collections. There is a curious property residing in the style of the Stylidiums, which may be easily overlooked. When touched at a particular point, it springs forward with considerable force, particularly if it happens to have been grown in a situation where it has had the full influence of the sun's rays. The general time of flowering with S. fasciculatum is from the latter end of May until July; it can be kept back very well by shading if wanted later, but in that case must be exposed to the sun for two or three days before exhibition, to give it a good colour.

Although seldom seen at either of the great exhibitions of the metropolis, it is well deserving the cultivator's attention on account of the easy method in which it can be grown. Those who can manage Sedum Sieboldii can grow this Stylidium. The principal thing to keep in view is, to confine it to one crown, or one compact mass of shoots; this must be done in order to have a fine globular shaped plant. Procure a young plant with one crown. If it is pot-bound, shift it into a larger pot, using a compost of snuff-coloured peat, with a little leaf soil, and plenty of white sand; the pot must be well drained. Give a good watering, and place it in a warm part of the greenhouse, where it must have every encouragement, as frequent syringing, and constant attention as to a supply of water at the root; weak liquid manure water may be given about twice a-week through the season, until it begins to turn of a yellowish colour, when it must be discontinued, and water must be sparingly used until the following spring. Fumigation will also be necessary, as the plant is very subject to the attacks of aphides. When the wood is ripe enough to cut down, the stems are to be cut off to within three inches of the crown, and the plant is to be kept as dry as it can be to retain life through the winter months. In early spring it will show a disposition to start, and when this is observed, re-pot the plant, if this is necessary, or if not, remove some of the top soil, and fill up the pot with the same kind of compost before used. It must for some time be watered cautiously. Being a free growing plant, it will soon require shifting into a larger pot; but this must not be too large, as it likes to *feel* the sides of the pot. Continue this treatment until the plant is a fine-sized specimen, which will be in about the fourth season, if it was a single crowned plant at the outset; but if a good established plant in a six-inch pot is selected to start with, a good specimen may be had in two seasons.

The principal points to be attended to in the cultivation of this modest-looking plant are these:—To keep it very dry through the winter, and to give plenty of water in the growing season; to cut out any rambling shoots which make their appearance from the crown of the plant, so as to preserve a compact growth; and to avoid drip on the crown of the plant, which is fatal. There are some other species of Stylidium, very pretty in their way, but they are better suited to a botanical collection, than to be grown as specimens for ornamental purposes.

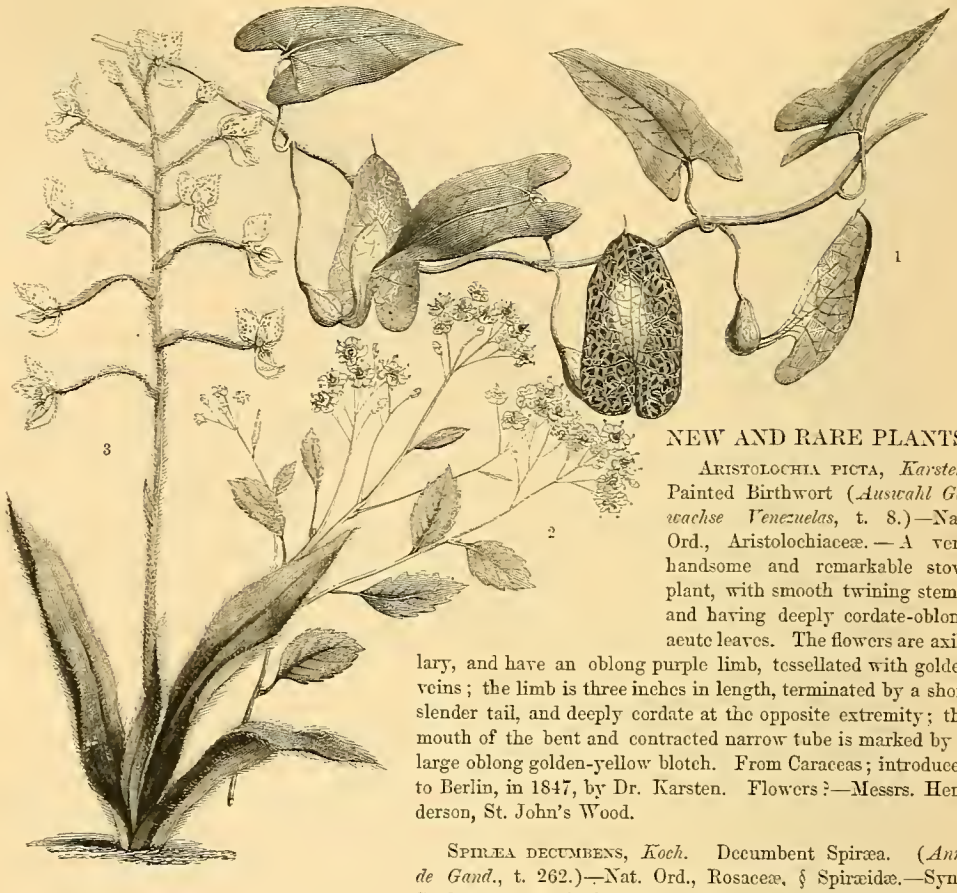
Among the ornamental kinds may be mentioned—S. adnatum, a dwarf biennial sort, with pale pink or blush-coloured flowers; S. ciliatum, with yellow or creamy flowers, perennial, and of herb-like habit; S. scandens, a climbing perennial, with deep red flowers; S. graminifolium, another herbaceous sort, with grass-like leaves, and naked scapes of rose-coloured blossoms; and S. tenuifolium, a perennial with pink blossoms. These may all be met with, more or less frequently, in cultivation. The genus is, however, at present rather neglected by cultivators, although several of the species, under good management, become very ornamental, besides having much of interest in their structure, when minutely examined. Nearly all the species, of which many are known, are natives of New Holland and the adjacent islands, extending, in one or two instances, to Malacca and the East Indies.

Miscellaneous Notices.

God in the Flower.—All the difficulties which I had ever heard infidels urge against Christianity occurred to me with tenfold strength, until my whole imagination was possessed with a fear that nothing existed which was not cognizable by the senses. I shuddered, and was agonized at the thought, and struggled to cast it from me as the most horrible of sins. Still it assailed me again and again, and I was foolish enough to suffer my mind to dwell upon such ideas, though I did not willingly consent to them or embrace them, and never ceased my ordinary devotional exercises. I strove, indeed, to pray, and with my *will* I did pray; though it was with the utmost difficulty I could realise the fact that I was speaking *to* such a being as God. Long time my mind continued to wander, and be agitated with storms of thought. By and by, mechanically, I plucked a flower that grew by my side, and looked intently at its structure, scarcely knowing what I was doing. I pulled it to pieces, and examined its minute structure, and admired the exquisite beauty of its delicate tints, and thought of the marvellous organization by which it was brought to the perfect state in which I saw it. Then, with the rapidity of lightning, an overwhelming thought struck me, and pierced me through and through. This flower, I thought, is but one of millions and millions and millions. And I strove to conceive of the multitude of flowers and leaves which I *knew* to exist in this earth alone. Often and often as I had pondered on the countless multitude of individual plants and animals which exist, never before had the fearfulness of that multitudinous quantity so completely siezed upon my mind. I looked upwards into the branches of a vast oak, under which I was sitting, and beheld its myriad leaves sparkling in the sun, and waving beneath the breeze. The boundless complication of the organization which was employed in the structure of that single tree absolutely appalled me. It came like an avenging power, and smote my intellect to the earth. I positively trembled at the contemplation of the wisdom, the skill, and the power which was exerted by the Creator of those gigantic boughs and innumerable leaves. Then it seemed as if a voice said to me, "What greater miracle than this is there in the faith thou art despising and disbelieving?" In a moment the madness of my pretending to criticise a religion because its mysteries were unfathomable, struck me with overwhelming force. There, before my eyes, I saw that which baffled all my utmost comprehension. What cannot *He* do, I thought, who made this tree? Then there swept across my brain a recollection of the truth, that this tree was but one of such multitudes, that mortal mind cannot even conceive their number; and that the Omnipotent agency which I saw at work in the flower in my hand, was equally exerted through the minutest details of every individual vegetable in creation; and yet, that all these wonders were hidden from almost all my fellow-creatures, and, as far as man is concerned, were seemingly useless, and a waste of Divine power and wisdom. The more I reflected, the more insane did it appear that such a being as I, or any other man, should presume to criticise a faith which, in my calmest moments, I knew was supported by unanswerable proofs. I perceived that the frightful thoughts which had been haunting me were but fond and foolish deceits, impressions made upon my imagination, and snares from which, as a rational being, I was bound to flee. Nevertheless, a terrible agitation still possessed me; and all I could do was to cry aloud, again and again, "O God, have mercy on me; for I am nothing, and Thou art all in all!"—*Capes' Sunday in London.*

New French Grapes.—Gros Dantas blanc; This variety, not so difficult to grow as the Grômier du Cantal, ripens its wood well, and is therefore as easily propagated as the Chasselas de Fontainbleau, and other old varieties. It forms one of the best dessert grapes, and so hardy as to ripen its fruit in any aspect or situation, whether on the wall or espalier. The branches are very robust, somewhat thick at the base, becoming gradually smaller towards the apex; short jointed. The leaves are broad, with long petioles unequally lobed and toothed, with a few hairs distributed over the surface of both sides. The bunches usually measure from five inches to five inches and a-half across the shoulder, and from six to eight inches in length. The fruit is large, round, white, faintly tinged with yellow on the side exposed to the sun; its skin is thick, the flesh firm, sweet, somewhat aromatic, and very agreeable. The following good sorts are in M. Barbat's collection:—*Gros Ribier du Maroc*, fruit large, oblong, black; *Malaga*, fruit large, oblong, rose-coloured; *Grosse Perle du Jura*, fruit very large, oblong, white; *Superbe de Candolle*, fruit very large, oblong, rose-coloured; *Trousseau*, fruit large, round, black; *Gros Grains de la Drome*, fruit large, round, black; *Burgere*, fruit large round, black; *Rose de Damoiselle*, fruit large, round, deep rose-coloured merging to a pale violet; *Bourdelais hatif*, fruit large, oblong, black; *Madelaine Jacques*, fruit of a medium size, round, white; *Muscat noir de Frontignan*, fruit of a medium size, round, black; *Muscat Arrouya*, fruit of a medium size, round, black; *Gros Guillaume*, fruit round black. All these varieties are first-rate.—*Revue Horticole.*

Ranunculus Ficaria edible.—Plants of this species, the Ficaria verna of some authors, raised from roots which had been gathered in Silesia by the Rev. Mr. Wade in 1848, have been raised by Mr. M'Nab of the Edinburgh Botanic Garden. These roots had been exposed over a large extent of country in Austria by heavy rains, and the common people gathered them and used them as an article of food. Their sudden appearance gave rise to various conjectures as to their nature and origin, and in the Austrian journals they were spoken of as if they had fallen from the sky. The small bodies were used as pease by the inhabitants. Mr. M'Nab had tasted the dried specimens, as well as fresh roots of Ranunculus Ficaria gathered in this country, which, after being boiled, he found very amalyceous. There is no acridity in the roots even in their fresh state.



1. *Aristolochia picta.*
2. *Spiræa decumbens.*
3. *Ponthieva maculata.*

NEW AND RARE PLANTS.

Aristolochia picta, *Karsten.* Painted Birthwort (*Auswahl Gewachse Venezuelas*, t. 8.)—Nat. Ord., Aristolochiaceæ.—A very handsome and remarkable stove plant, with smooth twining stems, and having deeply cordate-oblong acute leaves. The flowers are axillary, and have an oblong purple limb, tessellated with golden veins; the limb is three inches in length, terminated by a short slender tail, and deeply cordate at the opposite extremity; the mouth of the bent and contracted narrow tube is marked by a large oblong golden-yellow blotch. From Caracas; introduced to Berlin, in 1847, by Dr. Karsten. Flowers?—Messrs. Henderson, St. John's Wood.

Spiræa decumbens, *Koch.* Decumbent Spiræa. (*Ann. de Gand.*, t. 262.)—Nat. Ord., Rosaceæ, § Spiræidæ.—Syn., S. flexuosa, *Reichenbach* (not *Fischer*); S. adiantifolia, *Belgian Gardens.*—A very neat and pretty hardy undershrub, growing about a foot in height, with weak trailing tufted stems. They are smooth and of a deep brown colour, bearing alternate obovate or oval leaves, three-quarters of an inch long, green above, glaucous beneath, entire and wedge-shaped at the base, but serrated towards the apex. The flowers are numerous on the young shoots, and grow in terminal corymbs; the petals are five in number, round, entire, white with a rose-coloured eye, and yellowish anthers; they are fragrant. From the mountains of the Frioul, in Illyria; introduced to the Belgian Gardens about 1848. Flowers in May and June. A pretty plant for borders, and probably adapted for rock-work.

Ponthieva maculata, *Lindley.* Spotted-flowered Ponthieva.—Nat. Ord., Orchidaceæ, § Neotteæ Cranichidæ.—Syn: Schonleinia benigna, *Klotzsch*, M. S.—A curious terrestrial orchid, well worth cultivating for its singularity of appearance. The plant, which grows from eight inches to a foot in height, is covered over with glandular hairs. From the soil issues two or three oval-oblong acute leaves, having some resemblance to those of Arnica montana; and an erect flower stem or scape, at the upper part of which is a loose raceme of several small, curiously formed, and as oddly coloured, flowers. The colour is a light ashy grey, punctured with brownish red in one part of the flower, yellowish, streaked with purplish red in another. The hairs which abound on the plant are mostly simple, and tipped, many of them with a small gland. The flowers are small.—From Silla de Caracas: found both on the ground, and on the trunks of old trees, in forests, in province of Merida; elevation 6-7000 feet; introduced in 1848. Flowers in February.

Erica regalis, *Storey.* Royal Heath.—Nat. Ord. Ericaceæ, § Ericeæ.—(*Florist*, iii., 34.)—A fine showy variety, with something of the habit, foliage, and vigour of the vestita group. The flowers grow in large terminal whorled heads, and are cylindrical, the tube about an inch in length, divided into four pointed recurved segments; the colour is a light rose.—A garden hybrid, raised by Mr. Storey of Whitehill, before 1844. Flowers in summer. Messrs. Henderson, Pine Apple Nursery, Edgeware Road.

FORSYTHIA VIRIDISSIMA.

Nat. Order, Oleaceæ.

Generic Character.—Forsythia, *Vahl. Calyx* very shortly campanulate, four-parted, deciduous. *Corolla* hypogynous, subcampanulate, four-parted, tube very short, limb contorted in æstivation. *Stamens* two, inserted at the bottom of the tube of the corolla, included. *Ovary* two-celled; ovules many in each cell, pendulous in several rows from placentas inserted on the middle of the dissepiment on each side; *style* short; *stigma* capitate, two-lobed. *Capsule* ovate, rather compressed, somewhat woody, corticated, two-celled, bursting loculicidally into two flattish valves having the septa in the middle. *Seeds* few in a cell, pendulous compressed, margined.—(*Endlicher, Gen. Plant. Na.* 3356.)

Forsythia viridissima, *Lindley*. Deep-green Forsythia.—Branches erect, square, leaves simple, oblong and oblong-lanceolate, serrated towards the summit, quite entire in the lower half; flowers appearing before the leaves, shortly stalked, in pairs, nodding; sepals roundish; convex, as long as the ovary.—(*Lindley, Journ. Hort. Soc.*, vol. i., p. 226; *Bot. Register*, 1847, tab. 39.)

DESCRIPTION.—A deciduous shrub, flowering before the leaves are produced. Branches erect and square. Leaves deep full green, simple, oblong and oblong-lanceolate, prettily serrated in the upper half. Flowers produced from large prominent buds scattered along the shoots produced the year before; numerous, forming a profusion of deep yellow blossom; they are shortly stalked, in pairs, and nodding; lobes of the calyx roundish, convex, as long as the ovary; lobes of the corolla broadly strap-shaped, emarginate.

History.—This plant was found by Mr. Fortune, first in a garden in Chusan, afterwards in the province of Chekiang, in China; and was introduced by him, some five or six years since, to the garden of the Horticultural Society, whence it has been distributed. Being a plant of easy propagation, it has now become rather extensively circulated. Our drawing was made in March last, from a forced plant in the possession of Mr. Ayres, at Brooklands Nursery, Blackheath.—A. H.

Culture.—The management of this plant appears to be very simple, for it seems to delight in any free soil, and grows with considerable freedom. Unfortunately the flowers are too delicate in texture to bear exposure to rough wind, as they are readily bruised, and soon show the effects of rough treatment; but, planted and trained against a wall, or in a very sheltered situation, it will be found a useful and excellent plant. Of its perfect hardiness there can be no question; and, planted in a sheltered situation, it will yield a quantity of flowers when such things are very acceptable. The Forsythia is readily propagated by cuttings, either of the young or old wood. If the young wood is used, the pot containing the cuttings must be plunged in a gentle bottom heat, and in a close frame, but cuttings of the matured wood will strike readily under a hand glass in the autumn, and like other deciduous plants they may be planted out before they begin to grow in the spring. To insure the plants blooming it is necessary that they be planted in rather poor soil, so as to insure well ripened shoots of a medium growth, rather than strong succulent ones, which rarely produce flowers, and are not so likely to resist the effects of a severe winter. Towards the evening and during the night the plant is slightly fragrant, but not sufficiently so to be perceptible except upon a near approach to it. As a plant for early forcing for the conservatory the Forsythia will be found very useful. For that purpose it should be grown in a pot so as to induce it to form a head of small well ripened shoots each of which will produce a quantity of flowers; the flowers are very durable and a plant in the conservatory will remain in perfection for several weeks. Perhaps the best treatment to insure success will be, to take nice strong plants in the spring, and pot them in pots suitable to their size, using a tolerably rich soil, and taking care to stop the shoots as they progress in growth, so as to insure the formation of a compact and handsome specimen. As the plants progress in growth give them pot room, by frequent shifting, but to insure their blooming they should not be shifted later than the end of July. A few plants introduced into the forcing house in November will be in bloom by Christmas, and by introducing a few plants every month a succession may be maintained until their natural season of blooming.—A.

CULTURE OF SEA-KALE.

By Mr. J. MIDDLEMISS, Gardener to A. POTT, Esq., Bentham Hall, near Tonbridge Wells.

IN general we do not find this much esteemed and valuable winter vegetable grown to that state of excellence which it is capable of attaining; nor is it cultivated to that extent to which one might expect to see it, when we consider the exotic-like deliciousness of a well-grown, well-blanched dish, served up *a la Soyer*. This, I believe, arises from a mistaken notion that a considerable extent of ground is necessary to indulge in, or rather to warrant the indulgence in this winter luxury—for such a good dish may be considered. An erroneous idea exists that it must grow two years previous to being forced. This I have stated is an erroneous idea, for it is equally a rotation crop with Peas, Broccoli, or, in fact, anything else.

In the following remarks I shall state a method of growing it in something like perfection, *in about nine months from the seed.*

It is not yet too late to begin, though it would have been better to have had the ground prepared in winter, and subjected to the influence of the frost, and the seed sown in the latter end of March, or the beginning of April. This, indeed, would have been absolutely necessary, if roots were wanted for very early work; but for the present we must content ourselves with some Sea-kale next Christmas, and not forget to be in time next year. Now we will begin at once, and have our seed in if possible sometime this month. Select a piece of ground, open yet sheltered, in extent according to the supply required; trench it three feet deep, using plenty of manure—at least a third part should be manure; one half would be better—and this manure should be well mixed with the soil in the course of trenching. If it cannot be well incorporated with once trenching, trench it twice, remembering that "anything that is worth doing is worth doing well," and that Sea-kale in particular delights in a deep, light, rich soil.

As soon as the ground is ready, strike it out into four feet beds, and sow two rows of seed, in patches two feet apart. As soon as the plants are up, thin out to two or three; and when fairly established, take all away but one. In the course of the season use abundant supplies of liquid manure, and keep the surface soil well stirred. Stirring the soil is of the greatest importance, whether the crop be Sea-kale, or any other, as it admits from the atmosphere the elements of which plants are composed. By this treatment the beds will be covered by the autumn with beautiful healthy leaves, and nice plump crowns. Pick off the leaves as they decay; and as soon as they are all off, the crowns should be slightly covered with ashes, or spent tanners' bark, till they are wanted for forcing, when they may be taken up, or forced where they stand. There are many different methods of forcing; but let us have some good plants, and we may speak of forcing matters by and by.

The above method of growing Sea-kale has been practised by many old gardeners for years; and, to my certain knowledge, by my father, with the greatest success, for the last quarter of a century; so that it is not a new method—but it is a good one.

HORTICULTURAL SOCIETY'S MAY EXHIBITION.

THE second of the great metropolitan floral fêtes took place on the 18th of May at Chiswick, under the auspices of the Horticultural Society; and a more brilliant assemblage of gay vegetable forms than were present there, could hardly have been desired. A finer May exhibition was probably never seen. The weather, though at some periods of the day threatening, was on the whole propitious, and secured to the Society a considerable attendance of visitors. Mention has already been made (p. 147) of the alterations that have been going forward with a view to the better ordering of the exhibition arrangements, and the convenience of the assembled crowds. The new arrangement of the grounds and the tents, which has been adopted, is a decided improvement on the former plan; and now that a beginning has been made, we expect to see the Society carry out other and more striking deviations from the monotonous formality that has for too long a period obtruded in these otherwise tasteful and gratifying scenes—scenes, however, the effect of which is greatly marred by the artificial appearance always presented by long, straight, narrow, and elevated lines of staging.

Undoubtedly the subject that first claims mention, in the brief sketch we shall offer of the leading features of the exhibition, is the Royal Water Lily, Victoria regia, of which we have just had the gratification of presenting our readers with figures and descriptive memoranda. Of this regal plant,

worthy to commemorate the illustrious individual whose name it bears, cut flowers and leaves were sent respectively from the gardens of the Dukes of Northumberland and Devonshire. These specimens we need not now describe, but it may be mentioned that the leaf sent by Mr. Paxton had the very curious rim well developed, the edge, which was about two inches deep, standing up quite perpendicular.

The number of other new plants was not great, but there were some interesting subjects, of which the most remarkable was a very distinct Rhododendron, sent by Messrs. Veitch of Exeter, and called R. jasminiflorum; it is a small evergreen shrub, with elliptic leathery leaves, one to two inches long, the branches terminated with an umbel of ten or a dozen jasmine-like, sweet-scented, white flowers, the narrow tube of which is an inch and a-half long, and the five-lobed limb an inch in diameter; if it proves a free grower, it will be a charming plant. Messrs. Veitch also had Bolbophyllum Lobbii, a rather striking Javanese orchid, notwithstanding that the flowers are dull, being tawny, clouded, and spotted with purple; Dendrobium transparens, a Nepal species, pretty, like a miniature nobile; an Anguloa, with creamy flowers, the inner surface of the petals and lip spotted with faint red; and a small Indian Cœlogyne, which has a blotch of yellow, margined with red-brown, on the centre of the lip. They had also Stylidium ciliare; Lycopodium taxifolium, a large-leaved, yew-like Lycopod, with the fructification on long, separate, drooping branches; and a cut specimen of the Medinilla bracteata. Messrs. Standish and Noble had a well-flowered plant of Viburnum plicatum, a showy shrub, which combines the flowers of the Guelder Rose with the foliage of the Hornbeam. Messrs. Henderson sent Acacia grandis, like pulchella magnified and grown hairy; Mr. Williams, gardener to C. B. Warner, Esq., Dendrobium Farmeri; and Mr. Stanley, gardener to H. Berens, Esq., of Sidcup, sent a couple of vigorous seedling Hovea Celsi, in which the leaves had become very broad and obtuse; with them was a Pimelea Verschaffeltiana, which sort together with P. Neippergiana, was also sent by Messrs. Henderson.

Amongst the specimen plants was Mrs. Lawrence's huge Pimelea spectabilis, in fine condition; a good Hoya imperialis, with nine umbels of flowers, from Mr. Glendinning; Erica vasæflora (p. 237), from Mr. Rucker's garden; a large shrub of E. Cavendishiana, from Mr Kinghorn, gardener to the Earl of Kilmorey; a very nicely-bloomed Mitraria coccinea, and Hoya bella, from Messrs. Veitch; and Rhododendron formosum, from Mr. Edmonds, of Chiswick House. Messrs. Henderson had a large well-bloomed Campylia holosericea elegans, and a large bush of Pimelea Hendersoni.

PIMELEA SPECTABILIS, exhibited by Mrs. Lawrence.

The Heaths were numerous, and in admirable health and bloom, but we are unable, from want of space, to particularize them. The principal collections were contributed by Mr. Leach, gardener to S. Rucker, Esq.; Mr. Smith, gardener to W. Quilter, Esq., Norwood; Mr. Cole, gardener to H. Colyer, Esq.; Mr. R. Rosier, gardener to J. Bradbury, Esq., Streatham; Messrs. Fairbairn, Veitch, and Rollisson. The more remarkable plants comprised the following kinds: E. tortiliflora, elegans, aristata major, vestita rosea, Cavendishiana, propendens, suaveolens, mutabilis, denticulata moschata, Sindryana—a beautiful sort, andromedæflora, primuloides, favoides purpurea, depressa, and florida.

The Indian Azaleas were, as they always are when good, gorgeous in the extreme; they were

contributed chiefly from the gardens of Sir E. Antrobus, Bart.; Mrs. Lawrence; W. F. G. Farmer, Esq., of Nonsuch Park; Messrs. Fraser, and Lane & Son. Most of them were large plants, and full of flowers, the best group being that shown by Mr. Green, which we were surprised to see placed second to Mrs. Lawrence's plants, which, though finely grown, were decidedly past their prime, and, on that ground, inferior to Mr. Green's. Several plants of sinensis were shown, in admirable condition; exquisita was also good, and there were fine examples of optima, coronata, variegata, præstantissima, triumphans, and lateritia, which comprise some of the best sorts that are grown.

The large collections of stove and greenhouse plants contributed by Mrs. Lawrence and Mr. Colyer, of Dartford, were both staged in admirable condition, the latter especially considerably improved since the 8th instant, though by no means comparable with Mrs. Lawrence's plants, which were large, clean-grown, well-flowered, and perfect on all sides. One of the most attractive plants in this set was a Boronia pinnata, about three feet in diameter and less in height, graceful in outline, and loaded with its rosy flowers; another was an immense Eriostemon buxifolium, together with Polygala acuminata, Podolobium trilobatum, and Chorozema Lawrenceanum. Mr. Cole's Clerodendron splendens was well out, and his plants were altogether in good trim; but the most remarkable among them was an Aphelexis spectabilis grandiflora, symmetrically regular in its growth and also in the production of flowers. Other large collections were sent by Messrs. Fraser, of Leyton, and Mr. Pamplin, of Walthamstow, the former of whom had the seldom-grown Hypocalymma robusta, and the latter Pimelea lanata, a distinct sort, now rather out of fashion. The collections of fifteen were contested by Messrs. Green and Carson, of Cheam; Gerrie, gardener to Sir J. Cathcart, Bart.; Taylor, of Streatham; and Ivison, gardener to the Duke of Northumberland. Mr. Green's Acrophyllum venosum was conspicuous; as also was a Sphenotoma gracilis. Mr. Carson's plants, which were rather formal, included a tall Bossiæa linophylla of beautifully drooping habit; Franciscea macrophylla, having about thirty heads of bloom, and Gardenia florida v. Fortuniana, with a dozen expanded flowers. Mr. Taylor's, a neat group, contained a good Epacris lævigata. Mr. Ivison had, in his collection, a large Gardenia Stanleyana, represented in the annexed engraving, the gay-looking Siphocampylos microstoma, and the very elegant Indigofera decora. Smaller groups came from Mr. Malyon, of Blackheath; Mr. Stuart, gardener to T. Huggins, Esq., of Norwood; Mr. Speed, of Edmonton; Mr. Young, of Camberwell; Mr. Glendinning, of Chiswick; Mr. Slowe, of Bayfordbury; Mr. Bruce, of Tooting; and Mr. Brian, gardener to G. Read, Esq., of Bridgewater.

GARDENIA STANLEYANA, exhibited by the Duke of Northumberland.

The Orchids were very numerous, and formed the most attractive feature of the exhibition. Mr. Mylam, gardener to S. Rucker, Esq., of Wandsworth, had the best of the large collections. The Saccolabium præmorsum, represented on the opposite page, formed part of this group, and had about twenty racemes of its charming flowers; a plant of S. guttatum, no less beautiful, had about the same number; an Aërides affine had fourteen racemes, and we noticed plants of Vanda suavis, and V. tricolor, the former with two trusses, bearing twenty-four blossoms, the latter with four trusses of bloom, there was also a lovely Dendrobium Devonianum, with its stems spirally trained into a pyramidal form, and loaded with flowers. Mr. Williams, gardener to C. B. Warner, Esq., had a very nice group, in which were well bloomed, but not large specimens of the Dendrobiums, nobile, macrophyllum, and Jenkinsii, and also a Lælia majalis, Mr. Rae, gardener to J. J. Blandy, Esq., of Reading, had some

Cattleyas—Mossiæ, with twenty flowers; Mossiæ aurantia, a fine variety, with the base of the lip deep orange-coloured; and C. Skinneri, with thirteen trusses, some of them bearing five or six flowers each; another group came from the garden of Mrs. Lawrence. Groups of fifteen were sent by Messrs. Veitch, Rollisson, and Dobson. The former lot had a beautiful plant of Vanda insignis, of which we have an engraving in preparation; and there was also a Cattleya Mossiæ, with upwards of a score of fine flowers, the curious, greenish, Grammatophyllum multiflorum, with three long upright racemes of expanded flowers, and one more raceme to come: and a remarkable Dendrobium nobile. Messrs. Rollisson had Cypripedium Lowii, Leptotes serrulata, and Acineta Barkeri. Mr. Dobson had a fine Dendrobium nobile. Smaller groups were sent by Messrs. Carson, Blake, Kinghorn, Ivison, Green, Brian, and Gerrie, and a large specimen of Dendrobium Calceolare came from Mr. Colyer's garden, at Dartford.

Pelargoniums were brought in very nice condition, and, for the most part, admirably grown, short and stocky, with noble blooms, just elevated over the foliage; this was especially the case with those produced by Mr. Cock, of Chiswick; Mr. Parker, of Roehampton: and in the fancy class, by Mr. Robinson, of Pimlico; others were shown by Messrs. Beck, Gaines, Staines, Ambrose, and Moseley. The most distinct, and strictly well-grown sorts, we saw, are noted below:—Pearl, Zanzummim, Rosy Circle, Salamander, Rosamund, Mont Blanc, Cuyp, Pictum, and Painter. Cape Pelargoniums were shown by Messrs. Parker, Staines, and Malyon. A few Calceolarias were shown, and a good assortment of Cinerarias, chiefly contributed by the Messrs. Hendersons, Salter of Hammersmith, and Lane of Berkhampstead.

SACCOLABIUM PRÆMORSUM, exhibited by S. Rucker, Esq.

The Roses in pots were very fine, those produced by Mr. Lane, especially so. The contributors to this department of the exhibition, were Messrs. Lane, Paul, and Francis, and Mr. Terry, gardener to Lady Puller, of Youngsbury; Mr. R. Rosier, and A. Rowland, Esq. The most remarkable plants were, Baron Prevost, Paul Perras, Duchess of Sutherland, Chenedole, Queen, Adam, Moire, and Armosa, in Messrs. Lane's group; and Madame de St. Joseph, Dr. Marx, Cels multiflora, Madeleine, Comte de Paris, Clementine Seringe, and Harrisoni, contributed by Messrs. Paul; besides which, Mr. Francis had a good Paul Perras; Mr. Roser, Baron Prevost, and Aubernon, in fine condition; and Mr. Terry, a well managed plant of Noisette Lamarque.

Mr. Green had a collection of Cacti, among which, Epiphyllum speciosum elegans, and coccineum grandiflorum; the former with deep rose-pink, the latter with rich scarlet flowers, were conspicuous; and with them was a good plant of the rare and very elegant E. Russellianum. Collections of Aphelexes, were sent by Mr. Cole and Mr. Green, the former of whom had Aphelexis sesamoides, humilis, humilis grandiflora, spectabilis grandiflora, grandiflora, and Helichrysum argenteum. Mr. Green had a variety, called sesamoides rosea. Messrs. Garraway & Co., of Bristol, contributed some hybrid Hippeastrums of great beauty; they consisted of "Aeramanni pulcherrima," with large, deep crimson flowers; amœna rosy, longitudinally veined, and having a white central band on each division of the flower; marginata odorata, crimson, the segments of the perianth with a narrow even margin of white, and marginata vennsta, crimson, with a broader irregular white margin, and a central white band. An interesting group of Lycopodiums, was contributed by Mr Williams, and consisted of L. cæsium, cæsium arboreum, Willdenovianum, umbrosum, Louisianum, circinatum, stoloniferum, and denticulatum.

Of fruit there was a nice display, for the season, and some kinds, especially the Grapes, were good. Pine-apples were sent by Mr. Davis, gardener to Lord Boston; Mr. Jones, gardener to Sir J. Guest, Bart.; and Mr. Slowe; but presented nothing for special remark. The Grapes were more numerous, and excellent samples came from the following exhibitors, to whom prizes were awarded:—Cannon Hall Muscats from Mr. Spencer, gardener to the Marquis of Lansdowne; Black Hamburghs from Messrs. Ingram of Frogmore, Turnbull, and Fleming, and from Messrs. Davis of Oak Hill, Mitchell of Brighton, and Toy; Sweetwaters from Messrs. Jackson, McQualter, gardener to Col. Challoner, and Davis; Black Frontignans from Mr. Toy. We also noticed good samples of Hamburghs from Mr. Elphinstone, gardener to the Speaker of the House of Commons; and fine, but unripe, Muscats from Mr. Turnbull. Some very good Royal George Peaches and Murrey Nectarines came from Mr. Fleming, who also sent Melons—the Hybrid Persian, raised at Trentham. May Duke Cherries were sent by Mr. Ingram and Mr. Fleming; British Queen Strawberries by Mr. Toy; and good Keens' Seedlings by Mr. Elphinstone and Mr. Meredith, gardener to the Duke of Sutherland at Cliefden. British Queen Strawberries in pots were also sent by Mr. Slowe. Finally, a collection of Apples and Pears of last year's growth, in fine preservation, came from Mr. Snow, gardener to Earl de Grey, and consisted of—*Apples:* Sturmer Pippin, Golden Harvey, Scarlet Nonpariel, Court of Wick, Ribston Pippin, Winter Queen, Boston Russet, Bull's Golden Reinette; *Pears:* Winter Warden and Uvedale's St. Germain.

We must not conclude without noticing an illustration of the quaint proverb, as to the effect often resulting from necessity, which occurred at this exhibition. So many plants were present that the ordinary stages could not be made to hold them all, and the supernumeraries were merely set on the grass, under an awning provided for other purposes. We venture to say, that for dwarf plants generally, especially such as Cinerarias and Pelargoniums, a stage very little removed from this make-shift plan would afford a better view of the plants than the more elevated stages generally employed.—M.

Miscellaneous Notices.

GARDENERS' BENEVOLENT SOCIETY.

The annual festival of this excellent charity was celebrated on Wednesday May 15th, at the London Coffee-House, when upwards of seventy of the principal nurserymen, seedsmen, and horticulturists of the metropolis and its vicinity assembled under the presidency of that amiable and excellent nobleman the Earl of Carlisle. The donations announced amounted to nearly £400. On the same day the Stanwick Nectarine, a very superior kind from Syria, was sold, the proceeds, £164 17s., being placed to the funds of the society by the liberality of the Duke of Northumberland, as the nucleus of a fund for the construction of alms-houses, "for aged and indigent gardeners and their widows." The characteristic and admirable speech of the noble chairman we give entire, being convinced that we cannot more effectually promote the object of the society than in giving permanency to his excellent and eloquent address:—

We have hitherto (said the noble Earl), dealt only with those great things and persons connected with royalty, war, and the concerns of empires; but we are met together this evening to put forward the claims of the Gardeners' Benevolent Institution (hear, hear). The first consideration that might naturally occur to myself is, what business have I to be in the chair on such an occasion, and to have thus the privilege of addressing you? for it is scarcely necessary that I should observe that I do not myself exercise the very honourable profession of a gardener, and furthermore I am sorry to say I am not fitted to hold the place amongst you I am now occupying by any knowledge or proficiency I have acquired in your delightful science (hear, hear, and a laugh). But there seems to me to be this peculiarity in the business or profession of a gardener, that while it admits of the highest possible degree of progress and perfection, it also, in its most humble grades, and in artificial methods, opens up sources of healthful, innocent, and pleasurable employment (cheers). The art of the gardener, dealing as it does with perhaps the most exquisite of all the raw materials which Nature supplies—the flowers of the earth—the art of the gardener seems to me to combine the healthy exercise and sturdy out-door life of the agricultural labourer, with the more intellectual and studious employment of furnishing models for the most ingenious imitations of the milliner, the most delicate enamellings of the jeweller, the richest colourings of the painter, the brightest day dreams of the poet (hear, hear), and there is hardly a spot of earth so rugged, scarcely a tribe of man so rude, that the art of the gardener will not be found to produce something like loveliness to the scene, and some idea of beauty to lift up the mind to the supreme fountain of light and beauty, and the Giver of all goodness (cheers); and the pursuit of gardening, gentlemen, seems to me not only to enhance, but also to make compensation for the beauties of nature; for the charms of scenery, and the loveliness of landscape, are necessarily confined to limited portions of the globe's surface. The full enjoyment of these can be but the privilege of the few, and it is only some amongst us who can visit, and comparatively very few can enjoy permanently, such scenes

as the valley of Cashmere, the Bay of Naples, the shores of Genoa, or even our own Windermere, Loch Lomond, or the Lakes of Killarney, present to us (cheers). But we must remember that there is hardly any spot of ground so built on but the monotony of the scene may be diversified by the gay parterre; scarcely a cottage so small that it may not have the Woodbine twining round its porch; nay, more, there is hardly a lodging or dwelling in the most squalid alley of this metropolis, but it may have its Geranium on the window-sill (hear, hear); and I have heard, and I believe the statement is true, that the poor weavers of Bethnal-green take especial pride in rearing their Geraniums, their Hyacinths, and their Tulips (Cheers). It would thus appear that there is a sort of spell or charm about flowers—something like magnetism, or mesmerism—which, independently of fashion, or the pleasures of sight and smell, tends to sooth the spirits and compose the mind. (Hear, hear.) I need not seek, gentlemen, to corroborate the respectability or honour of your craft, by alluding to its antiquity; but you will not forget that the first spot on which man was placed on earth was a garden, and it is fair to presume that the first avocation of man must have been that of a gardener (cheers); and the shrubs must have been green, and the flowers must have looked bright among the glades of Eden before sickness, pain, sorrow, or sin entered into our world. (Cheers.) However, gentlemen, we know that those drawbacks and disfigurements abound near the pursuit and profession of a gardener, as they do to every other calling or occupation. And this brings me especially to the claims which such a charity as this puts forth for your support. I learn, gentlemen, that the Gardeners' Benevolent Institution is adapted to afford relief to aged and infirm gardeners above sixty years of age, and their widows, in all parts of the United Kingdom; that it has now thirty-four pensioners upon its funds, eleven women and twenty-three men, whose claims have all borne the strictest investigation, and who have been reduced in their old age to penury and destitution; and I find that the average ages of these parties are seventy-four years for the women, and seventy-six years for the men. I am further told that it will appear by one of your rules, that this society, besides providing pecuniary relief for the distressed and broken down in the shape of charity, partakes also of the nature of a friendly society, and encourages contributions from gardeners, by contributing which, while in the hey-day of their vigour and prime, they acquire a right of preference and a title to the enjoyment of your bounty in the event of darker days coming across them. (Applause.) I find that during the few years (eight, I believe) that the Society has been in operation, it has contributed relief to the amount of £2,280. (Hear, hear.) But does the relief it is enabled to give meet all the claims made upon it? By no means. I regret to have to add, that, though this much has been done, yet at this time your committee, out of twenty eligible candidates for your bounty, can only elect two of them this year. (Hear, hear.) I have now to invite your considerate attention on behalf of these broken-down veterans in a pursuit so honourable, so respectable, and so useful. You will not forget—I am sure those who exercise the same craft will not forget—you will not forget, you who, by the favour of your Creator, are in easy circumstances, and in an affluent position, all the enjoyment you derive from what is beautiful to the sight and fragrant to the smell in the rich and varied products of your gardens. You will not forget that the life and pursuit of a gardener is a laborious one, and subject to much competition, subject to many reverses, subject to the change of taste, and the caprice of fashion, and trying and unhealthy to some constitutions; exposed to unhealthiness in some situations, and often bending the stout back and stiffening the active limbs of those who minister to your luxury, your comfort, and your pleasure. (Hear, hear.) These are claims which you will not, I am sure, forget. You will remember that in the brightest foliage, and in the most gorgeous colours, there often lurks the most mischievous poison, and that even the fairest rose is never without its thorn. (Hear, hear). Above all, you will remember that amid all that is bright and beautiful in nature, there is still no blossom of plant, or shrub, or tree that blows with such unfading colours—there is no scent of earth so fraught with undying fragrance—as the bloom of good and charitable works, and as the sweet-smelling savour of that pity which feels for the wants and relieves the distresses of our friends and our brothers. (Loud applause.) Gentlemen, I feel that a cause like this is safe in your hands, and I have only to recommend, with all good-will and all the fervour it deserves, the claims of this institution on your support, and to beg that you will join with me in drinking "Success to the Gardeners' Benevolent Institution." (Loud cheers.) The toast was drunk with three times three and one cheer more.

Atmospheric influence on Plants.—The pressure of the atmosphere has a decided influence on the form and life of plants. From the abundance of their leafy organs provided with porous openings, plants live principally in and through their surfaces; and hence their dependence on the surrounding medium. Animals are dependent rather on internal impulses and stimuli; they originate and maintain their own temperature, and, by means of muscular movement, their own electric currents, and the chemical vital processes which depend on, and react upon those currents. A species of skin respiration is an active and important vital function in plants; and this respiration, in so far as it consists in evaporation, inhalation, and exhalation of fluids, is dependent on the pressure of the atmosphere. Therefore it is that alpine plants are more aromatic, and are hairy and covered with numerous pores. For according to zoonomic experience, organs become more abundant and more perfect in proportion to the facility with which the conditions necessary for the exercise of their functions are fulfilled, as I have elsewhere shown. In alpine plants the disturbance of their skin-respiration occasioned by increased atmospheric pressure, makes it very difficult for such plants to flourish in the low grounds. The question whether the mean pressure of the aërial ocean

which surrounds our globe has always been the same, is quite undecided; we do not even know accurately whether the mean height of the barometer has continued the same at the same place for a century past. According to Poleni's and Toaldo's observations, the pressure would have seemed to vary. The correctness of their observations has long been doubted, but the recent researches of Carlini render it almost probable that the mean height of the barometer is diminishing in Milan. Perhaps the phenomena is a very local one, and dependent on variations in descending atmospheric currents.—*Humboldt's Aspects of Nature.*

Aberrant Fungus growth.—At a late meeting of the Edinburgh Botanical Society, Dr. Greville gave the following report on a specimen of fibrous matter from the Edinburgh Water Company's works, which had been presented at the last meeting by Mr. M'Nab, and a specimen resembling it, presented by Mr. G. Lawson, having been found on an old wheelbarrow in Dundee, by Mr. W. Ogilvie:—"The fibrous substance from the Water works is *Ozonium auricomum* of Link. Along with a number of other fibrous and byssoid productions, it is now regarded as either an imperfectly developed or aberrant form of some fungus. Ozonium, Himantia, Fibrillaria, Acrothamnium, Byssocladium, &c., are considered by Fries as the *mycelia* of Hymenomycetous Fungi, in a more or less monstrous state. I am not aware that the full development has ever been traced, so that the species has not been identified. The specimens from an old wheelbarrow are probably the same thing. Having been more favourably placed, there is evidently an approach to a higher development."

NEW AND RARE PLANTS.

Oncidium varicosum, *Lindley.* Varicose Oncid. (*Journ. Hort. Soc.*, v. 143).—Nat Ord., Orchidaceæ § Vandeæ Brassidæ.—A showy, strong-growing, stove epiphyte, one of the finest of the yellow Oncids. It has ligulate-lanceolate leaves, and large flowers, eighty or ninety in number, in a great branching panicle, supported by a strong glaucous stem, three feet long; the sepals and petals are dark green, banded with dull brown, the lip large, very bright yellow.—From Brazil; introduced in 1848, by M. De Jonghe, of Brussels, Flowers in autumn. Horticultural Society.

Erica laqueata lutea, *Storey.* Yellowish vaulted Heath. (*Florist*, iii., 34.)—Nat. Ord., Ericaceæ § Ericeæ.—A curiously coloured, but not very handsome heath. It possesses, however, novelty of colours, an excellent habit, being compact, and bushy, and a deep rich foliage. The flowers grow in clusters of from three to five, from the points of the little shoots; they are tubular, somewhat inflated, with a broad flat limb; the colour is very pale dull flesh colour, blotched with yellowish green.—A garden hybrid, raised by Mr. Storey of Whitehill, and obtained between tricolor coronata, and depressa. Flowers in summer. Messrs. Henderson, Pine Apple Nursery, Edgeware Road.

Philodendron striatipes, *Kunth and Bouche*, Striated-stalked Philodendron.—Nat. Ord., Araceæ § Caladicæ.—Syn., Caladium diversifolium, *Hort. St. Petersburgh.*—A curious stove perennial, stemless, with somewhat leathery leaves eight to nine inches long, oblong, sharply pointed, and slightly cordate, finely punctured with small pellucid dots; the long petioles are striated with olive colour. The spathe is convolute, ventricose at the base, narrowed above, straw-coloured, slightly recurved, and extending beyond the spadix.—From Brazil; introduced to Berlin in 1848. Flowers in July.

Calliandra brevipes, *Bentham.* Short-peduncled Calliandra. (*Bot. Mag.*, t. 4500.)—Nat. Ord., Fabaceæ, § Mimoseæ Acacieæ.—A graceful, smooth, stove shrub, much branched in habit, and growing four to five feet high. The leaves are alternate, with a pair of oblong pinnæ, closely set with the linear-oblong leaflets. The flowers grow in heads on short stalks, from the axils of the leaves, and consist of a small, inconspicuous, bell-shaped corolla, and a tuft of showy pale-rose stamens, the filaments of which are six times as long as the corolla.—From Brazil; introduced about 1848. Flowers in October. Royal Garden, Kew.

Cephalotaxus Fortuni, *Hooker.* Fortune's Cephalotaxus. (*Bot. Mag.*, t. 4499)—Nat. Ord., Taxaceæ.—A noble, hardy tree, stated to grow from forty to sixty feet high, the branches probably spreading or drooping. The leaves are large, quite distichous, and ranged like the teeth of a comb; three to four inches long, linear, gradually acuminate, dark green above, paler beneath. It increases readily by cuttings. At Bagshot, in Surrey, it has been found quite hardy during the winter of 1849-50.—From China: two hundred miles north of Shang-see; introduced, in 1849, by Mr Fortune. Messrs. Standish and Noble, of Bagshot.

Berberis lutea, *Ruiz* and *Pavon.* Yellow Berberry. (*Journ. Hort. Soc.*, v., 3.)—Nat. Ord., Berberaceæ, § Berberideæ.—A neat evergreen shrub, nearly if not quite hardy, probably growing six or eight feet high. The branches are downy, bearing spines, and small oblong leaves, which are of a deep shining green, undivided and narrow in the older plants, but with three or more spiny teeth when young. The flowers, which are yellow, grow in fascicles from among the leaves.—From Peru: mountains near Veto, at an elevation of 12,000 feet; introduced, in 1846, by Mr. T. Lobb. Flowers not yet produced in England. Messrs. Veitch and Son, of Exeter.

Azalea ramentacea, *Lindley.* Ramentaceous Chinese Azalea. (*Journ. Hort. Soc.*, iv., 91.)—Nat. Ord., Ericaceæ, § Rhododendreæ.—One of the smaller, neat-growing, imported varieties of Chinese Azalea, pretty, but too small to be very showy. It is a dwarf, close-growing, evergreen shrub, with flat, obtuse leaves, "often nearly round, or at most oblong." The small, white flowers grow in spare umbels from the ends of the shoots; the calyces and pedicels are glandless, but furnished with ramentaceous hairs.—From China: supposed to be from Hong Kong; introduced, in 1846, by Mr. Fortune. Flowers in spring. Horticultural Society of London.

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Cinerarias.

1. Madame Miellez.
2. Dr Bushell.
3. Electra.
4. Blue Perfection.

FLORISTS' CINERARIAS.

Nat. Order, Compositæ, § Senecionidæ.

Generic Character.—Senecio, *Lessing.*—*Capitules* homogamous, discoid, or heterogamous, *florets* of *the ray* ligulate, female. *Involucre* in one row, sometimes naked, sometimes calyculate, with small accessory scales, the scales very often sphacelate, sub-scarious at the margins, frequently two-nerved at the back. *Receptacle* without paleæ, naked or pitted, truncheon of the *style* of the hemaphrodite flowers truncate, and tufted with hairs only at the apex. *Achœnia* without beaks or wings, roundish or furrowed-angular. *Pappus* hairy in several rows, caducous, of subequal, straight, very slender, and scarcely scabrous bristles.

Ser. ix.—Canarienses.—Natives of the Canaries, Azores, or Madeira.

§ 1. Pericallides.—(Cinerariæ of many authors.) *Involucre* in one row, without accessory scales, many-leaved. *Ligules* numerous, flat. Shrubs or herbs; natives of the Canaries or Madeira. Cauline leaves petiolate, palminerved, angularly lobed, cordate at the base, often tomentose beneath, not unfrequently with auriculate stipules at the base of the petiole. Capitule corymbose, pedicels with little bracts. Fowers purple, white, or yellow.

DESCRIPTION, &c.—The varieties of garden Cinerarias figured in the accompanying plate, are scarcely to be traced to their original progenitors. They are probably descended through numerous crossings from certain of the species of the genus Senecio, which was included under Cineraria by the older authors. These are S. Heritieri and populifolius, shrubby species, and S. cruentus and tussilaginis, herbaceous species: all natives of the various Canary Islands, Teneriffe, &c. The colour of the ligulate florets of all these species, appears to be purple in the original condition, and I am not aware how the brilliant blue variety originated; so pure a blue is exceedingly rare in this family, where yellow, red, and purple, often, indeed, going as far as violet, are the prevailing colours.—A. H.

History.—The varieties represented in the plate are some of the best of the seedlings of the present year which have come under our notice, The raiser's name is attached in the following descriptions:—

Madame Meillez (*Ivery*), pure white ground, black eye, blue edge (the colour of the Neapolitan violet), not the slightest notch, petals broad, indentations between the petals slight, bloom abundant, and habit excellent.

Dr. Bushell (*Kendall*), white ground, amethyst margin, or tip, full average size, indentations slight, no notch, bloom abundant, truss well formed, habit good, opens flat or very nearly so, and general appearance novel.—G. G.

Electra (*Ivery*), a violet purple, petals broad, notch scarcely perceptible, outline tolerable, habit beautiful, size average, colour new, bright yellow disc, and flowers abundant.

Blue Perfection (*Ivery*), deep blue, approaching navy blue, size average, hardly flat, outline fair, habit good, bloom abundant, and scarcely any indication of notch, in many flowers none, colour quite new.

THE CINERARIA AND ITS PROPERTIES.

By Mr. G. GLENNY, F.H.S.

THE Cineraria is one of those flowers, and there are several, which made no advance until we published the criterion of a perfect flower. It cannot be said that any other person had ventured even an opinion of what it ought to be; so that, whether right or wrong, our dogma, as it was once called, was original, and the best proof that we were right is, that our notions have been universally adopted. In re-publishing the properties for the use of raisers of seedlings, we shall be guiding the young florists, who perhaps hardly know where the original instructions appeared; and they will act as a reminder to those who have grown careless.

This flower was once a poor narrow-petalled star; it was considered almost a species of madness to venture an assertion that it should be round to be perfect; but we laid that down, as a leading feature, which some averred it was impossible to approach, much less attain; yet what did it require? only that the number of petals should be increased, that these petals should widen, that the ends should be obtuse, and the notch, which was general, should be got rid of. This would have made a round flower; and we have already seen the indentations between the petals so slight, as to scarcely break the circle. There is a good deal depending on the colour in Cinerarias. The texture of the petal is naturally rough and stripy, or guttery—the colours are therefore dull; that is to say, the blue or the crimson, that would be rich on a glossy or velvety surface, is dull on a surface like rough paper. To bring this point more familiar, the colour of the common blotting-paper, instead of the

dulness which belongs to it, would, if transformed to shining glossy note paper, really, or at least comparatively, look rich and lively. The consequence of this peculiarity about the texture of the petals, is that unless the colour be very dense and bright in itself, there is a good deal to be deducted from the value on that score. The most brilliant self-colour is but a dull affair compared to the tipped sorts. This is the real cause of so many dull looking varieties, and led us to the consideration of improvements. To make a truly fine Cineraria, we must have a white ground; for, strange as it may seem, it will be recognised at once upon consideration that although a rough and spongy surface is unfavourable to colours, it is the reverse with white—no white is more pure than that of some of the Cinerarias, and the addition of an edge is all we desire. The purity of the white renders any colour a good contrast, but the most striking are crimsons and blues, for, in all their various shades of denseness and paleness, they are desirable. The edging, however, should be even, it should just form an even band of colour all round alike, and leave a well-defined circle of white surrounding a disc of some determinate colour. Too many discs are large in proportion to the flower, and being neither black nor yellow, look when developed, a sort of dirty grey. There is a want of distinctness and of contrast in such, which many ordinary growers lose sight of.

DIAGRAM OF A PERFECT CINERARIA.

A flower to be striking, then, should be white on the ground, distinctly banded with a dense colour or shade of some kind, the greater the contrast the better; and it should have a small black, or dark coloured, or bright yellow disc. Of the many Cinerarias we have seen—we may say many thousands—but few strike us as first-rate things. The discs of many are too large; the flowers of many too small; the colour too dull; the petals too rough; and a vast majority of those which ordinary certificate-makers think fine, are by no means deserving of notice. The petals should be smooth, and of a velvety or a glossy texture. There should be no ribs nor puckers. The bloom should naturally lay as flat as a shilling; and, if they deviate at all it must be by cupping rather than reflexing. But there are other points of no small consequence in the construction of the Cineraria, the foliage should spread and show an even surface of green, and above this, the flowers should form an even surface of bloom, the flowers setting edge to edge, and not, as in too many, making a heterogeneous bunch, one above another. All these points should strike a good judge at once—the perfect model should be in his mind, and the deficiency of anything that is before him should be apparent. The distinction of a first and second-class flower should be well understood. If a Cineraria, then, has a white ground, is circular on the edge, that is to say, above the average circular, with the ends of the petals free from notch, and with a distinct edging of colour, the flowers opening flat, and

in the truss setting edge to edge, and having also a good habit, there can be no difficulty in giving it a good character; but there are hundreds that would be rich for bedding, or admirable for specimens as pot-plants, and attractive in their particular way, that ought to have second-class certificates, if any.

Mr. Ivery of Peckham, has two flowers this year that were placed before a number of persons who had constituted themselves judges; but they gave the worst flower of the two a first-class prize; and the better of the two was not honoured with any distinction. We would humbly suggest to florists in general, that this does great mischief to the trade, because, so surely as an amateur is deceived in the purchase of an alleged good novelty, which turns out nothing, and misses a fine variety, which would have placed him better in competition, so surely does that buyer lose confidence in new things. As we do not write of these things carelessly we ought to name the two flowers which we have referred to in the foregoing remarks Madame Meillez (or as reported, Madame Meillery), is a flower of fully the average size, with a pure white ground, a blue tip, and a black disc; the petals broad, without the slightest notch, and obtuse, size above average, the indentations between the petals slight, the flowers abundant and tolerably flat; the blue is about that of the Neapolitan Violet, and the flower, therefore, showy; the tips form a moderately even band of colour, and the habit is good. Electra is a violet purple, size average, petals broad, notch scarcely perceptible, disc bright yellow, outline tolerable, habit good, flowers abundant, and therefore the plant showy; but although the colour is new, it is a self-colour. Now if either of these flowers deserved a first-class prize, the better one—the former—should have had it.

CINERARIA: AYRES' CŒRULEA COMPACTA, showing a desirable habit of growth.

But let us turn from this year's flowers to last year's, and chiefly for the purpose of noticing a variety that was but little known, but that must be had by every body that grows Cinerarias, or that wishes to grow them. We allude to Edmondsii, sent out last year by Mr. Bell of Norwich, and therefore now a trade flower. Nothing we have will stand by the side of it in some particular points; it is the most flat and perfect of the whole family; of full size; all the points in a very large proportion are to be found in it; the habit is good, and the form of the trusses exquisite. It makes a beautiful pair with Cerito, but beats it. Had it been well known before it was let out, five hundred more plants would have been sold in our own connection, but the trade will have the benefit of the greater distribution. It has a white ground, nicely edged with one of those colours which ladies only can describe, but it is, besides all we have said, the best we have seen as yet.

Mr. Kendall has some fine ones, but, generally speaking, the discs of his flowers are large; and it will strike every body, that the disc being the most ugly part of the flower, cannot enlarge without trenching upon the richness of the bloom. When we speak of a large disc, we of course mean large in proportion to the size of the flower, for there is everything in proportion—that which would be outrageous in a small flower, would be moderate in a large one. The disc should be from a fourth of the entire diameter to, at the very most, a third. Upon the whole, the greatest error that censors appear to have fallen into with regard to the Cineraria, is that of omitting to regard the colour. We know form ought to go first, but contrast is a great point always, and brilliance indispensable. Let any one look at a dozen of the very best dull reds, blues, purples, or slate colours, and then turn to white and blue, white and crimson, or white and anything, and the relief will be astounding. While, therefore, we abound in dull selfs, and fine banded, or, as they are called, tipped whites, are scarce, it behoves censors to be sparing of their distinctions. Even a white self, pure as it may be, is a sorry looking affair contrasted with those which have edges or tips.

One more point is worth urging at this moment, though we have half adverted to it already; we allude to the flowers, which, instead of having well-defined tips, that is a circle of white within a bright band, have tips that shade down gradually into the white, and have no defined line. This shaded or clouded family, or branch of the family, is but little better than the selfs, and unless the varieties possess extraordinary claims on account of other features, would be rarely entitled to a place

among the best. We have gone more deeply into the properties of this increasing favourite than we at first intended, because, although we published the outline of the properties of all flowers some years ago, we generally confined our rules to the establishment of leading principles, leaving in some flowers considerable room for variety; our grand object being to settle the form, and leave a good deal to fancy as to the colours, which, except in certain points of distribution, may be regarded, to a great extent, as matters of taste. We arrive therefore at these conclusions:—

The flowers should be round, without indentations between the petals, and without notch on the petals, the edges being smooth.

The petals should be broad, obtuse at the ends, thick, of fine texture, and sufficiently numerous to form a close circle.

The truss should be large, the flowers edge to edge, forming a rounding surface; they should also set edge to edge, so that the entire bloom should form one large head, rather higher in the middle than at the sides.

The ground of edged flowers should be pure white, the colour on the edges all alike, dense and well-defined, so as to form a complete equal ring all round the outer edge of the flower, not shading into the white, but abrupt, and the greater the contrast the better.

The colours of all, whether selfs or edged, should be brilliant. The rank in which different characters stand in competition, is: well-defined edged varieties first, positive bright selfs second, clouded and shaded flowers last, and this last extends to even those with white grounds, if they shade off gradually to a margin of colour, instead of abruptly terminating the white and commencing the margin.

MINIATURE OR POMPON ROSES.

By Mr. JOHN SAUL, Durdham Down Nursery, Bristol.

THE beautiful Roses of summer, and the splendid varieties of autumn, are beginning to receive that extensive cultivation which they deserve; but among the classes which bloom at the latter season, are scattered some of dwarf and distinct growth, which have not been very specially noticed, and which I propose collecting together for bedding purposes under the head of Miniature or Pompon Roses. In the catalogues, there is at present a small group called Miniature China Roses (Rosa Lawrenceana); these shall be noticed; and there are many other very dwarf Roses in other classes which will group much better with them, and with each other, than in the classes where they are now generally placed. It may be argued, they have little affinity with the Miniature China. True; but I think there can be quite as little affinity traced between such Roses as Nemesis and the strong-growing Noisettes (the class in which it is generally placed); or, again, between Coquette de Montmoreney and many of the strong-growing Perpetuals. Indeed, Roses are now become so blended and mixed together, by crossing and seeding, that it is become next to impossible to refer them certainly to this or that class or group. If we, therefore, can collect together, from several classes, Roses of dwarf, unique, and similar habits of growth, which will contrast admirably in grouping, from their singularly pleasing and distinct colours, mode of flowering, &c.; and if we place them under this head, I think we shall have a class as distinct, and as suitable for the object in view, as any class of Roses we as yet possess. They may be called the Fancies, with as much propriety as the Pelargoniums of a given kind are so named in distinction from the others. In the Rose-garden they will be found, if possible, more distinct than any other group or section, being of very dwarf habits. When grouped, confining one variety to a bed, the beds should be small, as should also the flower-garden. In large beds or gardens, grown in this latter way, they would not be in keeping, though they can be grown in mixed masses, in such a garden, by using judgment in contrasting the colours. The following selection, though small, will be found really distinct and good.

MINIATURE OR POMPON ROSES.

1. *Clementine Duval* (dwarf hybrid Perpetual).—Light rose colour, brilliant and beautiful; rather a slow grower; a most profuse bloomer from May to November; every little shoot is terminated with a bunch of flowers. A neat and distinct flower.

2. *Coquette de Montmoreney* (dwarf hybrid Perpetual).—Cherry colour, shaded with violet. This truly unique Rose has but one fault, namely, that of blooming itself to death. From its first efforts of growth in spring, to the latest in autumn, the shoots, on attaining a few inches in length, commence blooming; and through the season it is clothed with its distinct and pretty flowers. Extremely beautiful and distinct.

3. *General Merlin* (dwarf hybrid Perpetual).—Bright rose colour, very beautiful; rather of dwarf growth, like the preceding; from its abundance of bright flowers it contrasts nicely with many of the others. Perfect and good.

4. *Leonie Verger* (dwarf hybrid Perpetual).—Colour, rosy pink, brilliant, very beautiful, though rather delicate. A free flowerer. Very distinct and fine.

5. *Pauline Bonaparte* (dwarf hybrid Perpetual).—Pure white, distinct. This will be found very useful, affording a colour to contrast with the others. Very pretty.

6. *Pompon* (dwarf hybrid Perpetual).—Rosy pink; small, but extremely pretty. This very beautiful little Rose should be in every collection, however small; it is of dwarf growth, blooming profusely in clusters. Distinct and striking.

7. *Pompon de St. Radegonde* (dwarf hybrid Perpetual).—Brilliant purplish carmine, of rather stronger growth than the preceding, and flowers larger; but, like it, quite unique and pretty.

8. *Psyche* (dwarf hybrid Perpetual).—Bright pink, neat and pretty, blooming freely in clusters; in growth a little freer than some of the preceding. A charming variety, and will group well with the others. Very beautiful.

9. *Pactolus*, or *La Pactole* (tea-scented China).—Bright yellow, blooming in clusters, very freely; will be found the best yellow to group in this section. From its freeness of bloom, together with its habit of growth, this fine Rose is indispensable.

10. *Nemesis* (Noisette).—Very deep crimson, blooming abundantly in clusters, through the summer and autumn, and will be found to group in contrast admirably with the other varieties. Though classed as a Noisette, it is very distinct from that section, and will be found more at home with the little group I have attempted to collect together. A distinct and good Rose.

11. *Alba* (miniature China).—Pure white; rather too delicate for out-of-doors, but what ladies call a "tiny beauty" when grown in very small pots. This, with the few following, are found in catalogues in the class that are usually called miniature China. Very pretty.

12. *Blush* (miniature China).—Blush; though not so striking in colour as some of the others, it is an extremely free flowerer, and grows stronger than some of those classed as dwarf hybrid Perpetual. Will be found useful in bedding with the others. Makes a good strong edge.

13. *Crimson* (miniature China).—Brilliant crimson, clothed through the season with its lovely little flowers. This is unquestionably the very best Rose we possess for edgings for Rose-beds, or the Rosary in general, being perpetually in bloom, and a free, though tiny grower.

14. *Jenny* (miniature China).—Brilliant crimson, and, like the preceding, continually in flower. A very pretty and desirable miniature Rose.

In giving instructions how to grow these Roses to perfection in the flower-garden, I shall commence with the preparation of the beds. If these are not naturally well drained, they should be so artificially; for to grow these delicate Roses in a wet retentive soil, and preserve them alive through winter, is a matter next to impossible. Indeed, in all cases it would be well to guard against too much moisture by placing plenty drainage in the bottoms of the beds. Eighteen inches of soil will be found quite sufficient in the beds. If the natural soil is a pretty good loam, it will be only necessary to add some well decomposed dung—cow-dung is excellent—with a small portion of sand, and well blend them together. But should the natural soil on the contrary be bad, it will be better removed, filling up the beds with good loam full of fibre. This latter is the best of all soils, where it can be procured; but where this cannot be had, any good garden soil will answer, by adding cow-dung with a little sand as before.

In selecting plants I would, by all means, recommend them to be on their own roots. Worked plants are but very short lived; indeed, how can we expect them to be otherwise on the stocks on which they are generally worked. Here we have a class of Roses of dwarf growth, with tiny foliage, very frequently worked on strong luxuriant stocks; for the first season growth proceeds generally very well, caused I should say by the quantity of organizable matter stored up in the stock from the preceding season. But whilst the growth of the head goes on the first season, there is also a powerful root action propelling into the stem and leaves abundance of crude matter collected by the numerous feeders. In former years its own expansive foliage was capable of digesting and assimilating all matter sent up; now this is replaced by very delicate foliage, incapable alike of containing, digesting, or assimilating it; the small and puny leaves are gorged to excess, their healthy action is impaired, and when they sink into repose in the autumn, it frequently ends in the sleep of death. Some, however, will perhaps linger through a second, but rarely will they pass a third season alive, when worked upon the description of stocks I have been speaking of. To this cause I attribute the neglect of that beautiful and interesting class of Roses—the *dwarf hybrid Perpetuals*, namely, the frequent losses of those who purchase them. Procure them, therefore, on their own roots, until such time as they are worked on a stock a little more consonant to their nature. In planting, if they are intended to be pegged down, fifteen inches apart will be found sufficient space; but if grown to show their beauty separately, eighteen inches may be allowed. Pruning should be performed about the end of

March, when all danger from severe frost is past. This will of course vary with the season and locality; in many parts of the country the first week in April will be found early enough. The knife must be used sparingly; they require little or no shortening; to cut out all dead wood, and regulate the branches, will in general be found sufficient.

As the summer progresses water with liquid manure occasionally, say twice a-week, and continue when necessary through the summer. The liquid manure must not be over strong, for, being delicate growers, they cannot digest the coarse food which the strong-growing hybrid Perpetual and other Roses are capable of taking up. Through the summer all decaying flowers should be continually removed, and, where they bloom in clusters, cut back to the next bud, from which they will break and bloom again in the autumn. Any strong shoots which it is perceived are not likely to bloom, should have their extreme points pinched off, on attaining the length of five or six inches; the laterals from these will bloom freely. By a little attention in this way this charming class of Roses will bloom profusely through the summer and autumn, and well do they merit this care. During winter keep the beds as dry as possible; and if trouble were taken to protect them from all the wet of winter, they would flourish much better from being kept comparatively dry. A slight protection will be found useful through winter and early spring, particularly for Nos. 4, 5, 6, 8, 9, 10, 11, 13, and 14; the others will not require it. To attempt to give any directions for contrasting their colours will, I think, be unnecessary, as much would of course depend on the description of beds, the number of of plants, &c. This point gardeners and amateurs will easily work out for themselves.

The pot culture of these Roses is extremely simple;—procure a collection, say in spring, give them a moderate shift, using good turfy loam, and rotten cow-dung; grow them through the summer in a frame, pit, or any structure by which they can be protected from heavy rain; water occasionally with liquid manure, not too strong; pinch off all flower buds as they appear, and the points of all shoots when about four inches long; give another shift in the course of the summer. Proceeding in this way, we shall have nice bushy little plants by September, at which time they may be shifted into their blooming pots, which with this class of Roses must not be over large. Use the same simple compost as already recommended, drain well, and neatly tie down the branches, as is generally done with Geraniums; keep them in a cool well ventilated pit or house through the winter, giving very little water. I have been in the habit of keeping them pretty dry. On the return of spring commence with a little liquid manure, which may be increased as the plants progress and summer approaches. Pay the same, or a little more exact attention as recommended for out-door culture, and beautiful little specimens will be the result.

CULTURE OF THE DAHLIA FOR EXHIBITION.

By Mr. T. Barnes, Dane Croft Nurseries, Stowmarket.

THE plants intended to be grown for exhibition should be short-jointed, stout, and healthy. To obtain them of this description they should be raised from cuttings taken off in April, and struck in a gentle hot-bed or forcing-house—the first is preferable. As soon as rooted, they must be repotted into pots about five inches in diameter, placed again in gentle heat, and allowed plenty of air.

Cuttings struck at this time are more healthy than those rooted at an earlier period, and are consequently better adapted to the purpose. In a week from the time they were potted they should have a watering of liquid manure, made from guano and powdered charcoal; this will be found of great service, and should be repeated before the planting out. If any symptoms of green fly occur, the plants should be fumigated with tobacco.

My plants are generally subjected to this treatment, and by watering them in the evenings with clear water, they are kept in a healthy growing state till the season of planting out. This operation should not take place before the twentieth of May, nor later than the fifth of June. My mode of planting may be described thus:—The plot of ground is marked into beds three feet wide, with intervening paths three feet also; about four inches of the soil from the beds is thrown on the paths; this raises them something like six or eight inches above the beds, the beds are then well dressed with rotten manure, say to the thickness of four inches; they are then deeply and thoroughly dug; the stakes are put down secure at the distance of six feet apart, and the planting commences, followed by tying and watering. From the moment the plants are put out a diligent search must be made for slugs, earwigs, and other pests. As the lateral shoots require support, they must be tied out, and the plants must be kept watered, and the soil stirred once in two or three weeks as may be required. The plants being thus situated, no water that is given them can escape; basins around the plants are avoided, as is also the practice of mulching—a practice always attended with more injury than be-

nefit, the material forming, as it does, ready hiding places for the slugs, &c., bringing the roots to the surface where they are exposed to the influence of the burning sun, and the danger of mutilation by the forks in stirring the soil.

The following are twenty-four good show flowers :—

Andromeda, lemon and pink.
Black Prince, shaded.
Buffalo Girl, buff.
Captain Warner, crimson.
Dauntless, yellow.
Duke of Wellington, orange.
Essex, rosy lilac.
Fearless, lilac.
Grenadier, ruby crimson.
Lord Mayor, maroon.
Miss Chaplin, peach and bright pink.
Mr. Seldon, mottled purple.
Mrs. Anderson, rose.
Negro, dark.
Nonpariel, scarlet red.
Purple Standard, dark purple.
Princess Radziville, tipped.
Queen of the East, blush.
Queen of Sheba, white.
Richard Cobden, shaded maroon.
Scarlet Gem.
Standard of perfection.
Toison d'or, orange buff.
Yellow Standard.

The following are twenty-four distinct and good fancy varieties :—

Belle Etoile, scarlet and white.
Bou Maza, nankin and white.
Belted Knight, amber and white.
Candidate, black and white.
Conspicua, purple and white.
Discount, black and white.
Gasparine furstin Reuss, brown and white.
Gen. Cavaignac, purple and white.
Empereur de Maroc, black and white.
Jenny Lind, crimson and white.
Keepsake, crimson and white.
Leibliche Von Elsentholl, yellow and white.
Madame Ebenth, purple and white.
Miss Blackmore, purple and white.
Miss Jane, rose and white.
Madame Chauviere, pink and white.
Madame Wachy, purple and white.
Miss Watson, lilac and white.
Mons Affre, cherry and white.
Œillet de Boheme, orange-striped.
Rainbow, scarlet and white.
Remembrancer, scarlet and white.
Striata perfecta, lavender-spotted.
Sunbeam, crimson and white.

In the above selections I have avoided the names of new flowers; some of which would, however, of course, make this selection better.

A FEW HINTS ON ORNAMENTAL PLANTING.

By Mr. J. COX, Gardener to W. Wells, Esq., Redleaf.

IN planting trees for decorative effect, it is necessary, besides studying their future size and characteristics, to combine with it a judicious choice of position, and this must be regulated, in a great measure, by the different points of view from which it is desirable the plants should be seen. The small proprietor, who adorns his lawn and pleasure-grounds with a few favourites, will most likely be desirous of seeing them from the windows of his mansion, and should, therefore, distribute them about in such a manner, that, whilst forming an ornament to the house and grounds, they may not, at a future time, shut out the view of the surrounding scenery; in fact, the principal aim ought to be so to distribute them, either in groups, or single specimens, that they may appear to be blended with it, and partake of its character; and anything like a belt, or continuous line, should be studiously avoided from the principal points of view. But, on the other hand, the proprietor, or planter, of an extensive arboretum, whose operations may extend over miles of ground, has a wide field for the exercise and display of taste and judicious arrangement; for he has the power, in a measure, to form his own scenery, and, therefore, whilst seizing and turning to his purpose every natural advantage arising from irregularities of the surface, or the presence of trees, will not scruple to use every artificial means to create such where wanting, or to increase the beauty and fitness of the natural advantages. It appears to me that it ought to be a leading idea to get as many points of view from which interesting specimens of trees, or little peeps of scenery may be seen; and, in this view of the subject, I consider that the disposition of the walks, or drives, through an extensive arboretum, is of equal importance to the proper arrangement of the trees themselves; and they should be so arranged as to disclose new features at every step. Here may be shown the majestic Cedar gracefully waving its long branches over the precipitous crag—there a group of Douglas Firs towering upwards, and with their lower branches reposing lightly on the verdant turf—now and then, the eye may be presented with a view on a large scale, including many objects of interest and beauty; but, generally speaking, we are most struck with, and pleased by, those little happy combinations of fairy-like scenes which the eye is capable of taking in at once, and has not its attention distracted by unlimited extent, or a multitude of objects: these little combinations cannot be produced by the aid of large trees alone, and hence the necessity for an undergrowth of shrubs, the disposition and arrangement of which afford many means of producing a great variety of pleasing combinations, to do which with effect nature must be taken as a guide. Formality is, of all things, the most to be avoided; and, therefore, large beds of shrubs

with formal borders or edges, are entirely out of place: the turf should, in all cases, run completely under the branches. In the disposition of the outlines there are few cases in which a straight, or continuous line is desirable; on the contrary, indentations and projections cause variety, and create effect. Amongst the many varieties of shrubs and trees applicable for our purpose in this department, I know of none to excel the Holly: it will make a fine tree, if properly treated; or if headed back occasionally, it takes the form of an ornamental evergreen shrub, and is, therefore, one of the most eligible to be planted, either for itself, or to assist in forming the screens which separate the different parts and views. And I do not see why a great many of our strong-growing climbing Roses might not be introduced into such places with very good effect. How pretty they would look rambling over the tops of the shrubs, or up the sides of rocky acclivities, unchecked by the pruning-knife, and following their own course! And why should the wild Honeysuckle alone be allowed to display its beautiful pendant festoons and wreaths of flowers, when we have so many other kinds, quite as hardy, and much more gay, which might be planted in various parts, and left to ramble at will, and display their beauty after Nature's fashion, instead of being from year to year shorn of their fair proportions, and laid in to flower against a wall with mathematical precision, or tied to a long pole, where, for half the year, they give one an idea of a bundle of brushwood stuck on end. There are many other plants which will readily occur to the practical reader, as applicable for this purpose.

Seedling Florists' Flowers.

Under this heading it is our intention to give a descriptive notice of such seedling Florists' Flowers of interest as come under our notice at the metropolitan exhibitions, and at other places during the month, enumerating such only as appear likely to become of permanent interest, either for their superior properties, or as remarkably showy plants, and such only as we should not hesitate to purchase ourselves. To specify a tithe of the plants which come under our notice during the season would be to fill our pages with a list of, to a great extent, worthless things; and, though it may be of importance for the uninitiated to be guarded against worthless things, yet, as we name the good ones, and are willing to take the responsibility of those we recommend, it will not be our fault if indifferent plants do get into cultivation. It frequently, however, happens, that a plant, though deficient in qualities, may be new in colour, distinct in habit—indeed, may differ so much in general appearance and character, as to be of considerable interest in a decorative point of view; where such is the case we shall always notice it, and if we do this sometimes to the exclusion of others, we shall always be ready to defend ourselves for so doing. However fine and perfect a flower may be, if the plant is not at the same time of good habit, and constant in the production of good flowers, it must be worthless to a great extent, and ought on that account to be discarded; but, on the contrary, if a plant is deficient only in form, and is rich in colour and other properties, it is fairly entitled to recommendation and cultivation as a market plant. Some seedling Auriculas and Polyanthuses have been seen, but these will be noticed by Mr. Glenny, when writing upon their properties.

PELARGONIUMS.

The season is rather early for seedlings of this year, but some of the best of those of 1849 have been shown in tolerable trim by the two great competing raisers, Messrs. Beck and Hoyle. The season, however, so far has been unkind, and we have no doubt the flowers enumerated below will be seen in greater perfection at the next exhibition.

Incomparable (Beck).—Upper petals crimson scarlet, with rich dark blotch, under petals scarlet, but rather shy.

Little but Good (Beck).—Rich orange scarlet, with dark spots, under petals crimson scarlet. A tolerable truss.

Rosa (Beck).—Too near the preceding in colour, but still a desirable flower. Habit and truss good.

Major Domo (Beck).—A prodigiously large rose-coloured flower, with rich dark blotch, and fine formed petal, and good truss. Habit of plant excellent. A distinct and desirable kind.

Diana (Beck).—Upper petals light rose, with dark blotch, and clear white throat. A large flower, and tolerably good.

No. 1. (Beck).—Upper petals purplish crimson, and dark spots, under petals deep rose-veined, and clear white throat. Habit and truss tolerable.

No. 2. (Beck).—Upper petals crimson with black spot, under petals rosy crimson with spot upon each. Moderate trusses.

No. 3. (Beck).—Deep rose colour, with a rich blotch, under petals light rose, with a clear throat and nice truss.

No. 4. (Beck).—Large flower, bright rose colour, with dark spot, clear and distinct throat. Good truss.

Purpurea (Beck).—A rosy fine flower, with dark spot. A fine trusser, and of good habit.

Eclipse (Hoyle).—Upper petals orange scarlet, lightly clouded, lower petals scarlet. Habit good, with a fine truss.

Heartsease (Hoyle).—Upper petals scarlet, slightly clouded, under petals scarlet. Habit tolerable, but a shy trusser.

Generallissimo (Hoyle).—Upper petals clouded with rich Spanish brown, under petals rose colour. Good habit, fine form, and good truss.

Celia (Hoyle.—Upper petals bright orange scarlet, dark clouded spots, under petals scarlet. Good trusses, and fine habit.

Ajax (Hoyle).—A remarkably fine bold flower, the upper petals rich deep mulberry colour, under petals dark rose. Fine form and truss, and good habit.

May Queen (Hoyle).—Upper petals bright rose, clouded; under petals light rose, with white throat. Fine truss and habit, but rather inclined to burn.

Corinne (Hoyle).—Evenly shaded rich upper petals, under petals purplish rose. Good form and truss.

Portia (Hoyle).—Rosy upper petals, with rich chocolate blotch; under petals rose colour. A free bloomer, and good habit.

Rosa (Hoyle).—Upper petals rich scarlet, dark feathered blotch; under petals scarlet. Good truss and habit.

Rubiola (Hoyle).—A rich crimson scarlet, with black spot, under petals scarlet. Fine truss and tolerable habit.

Cristine (Hoyle).—A fine formed rose flower, with pencilled throat, the upper petals a little crumpled. Very free bloomer, and fine habit.

Ocellata (Hoyle).—The most remarkable flower of the season. A purplish rose colour, beautifully spotted on *the lower* as well as the upper petals with rich chocolate. A true fancy flower, of tolerable habit, and a free bloomer.

Beauty of Montpelier (Rendle).—A rich clouded light flower, with a white throat, and good truss and habit.

FANCY PELARGONIUMS.

Perfection (Ambrose).—A very nice-formed flower of clouded rose colour. A free bloomer and of good habit.

Captivation (Ambrose).—A rich mulberry-coloured flower, of moderate form and habit.

Gaiety (Ambrose).—A pretty spotted variety of dwarf habit; ground colour flesh, with plum-coloured spots. A very free bloomer.

Exquisita (Gaines).—A very pretty flower, but too much like several others in cultivation.

CINERARIAS.

Some of these will be found noticed in a preceding page; the following have been seen since:—

Little Wonder (Ivery).—White tipped with cherry colour, rather large disc. Form good, most compact habit.

Queen of England (Salter).—A fine formed and very showy white flower of good size, with purplish rose edge, and of good habit.

Madame Sontag (Henderson).—A fine formed white flower, with rather deep lavender edge, and good habit.

Clara Mowbray (Henderson).—A distinct light red flower, of good form and habit.

Lady Hume Campbell (Henderson).—A remarkably neat white flower of fine form, with bluish purple edge and small disc. Habit good, and a very profuse bloomer.

Prima Donna (Henderson).—A bluish purple, of moderate form, and good habit.

Mrs. Sidney Herbert (Henderson).—A crimson flower of tolerable form, and neat dwarf habit.

Marion (Henderson).—A pretty white flower with rich deep rose edge, and of good form and habit.

Amy Robsart (Henderson).—Rosy red flower, of good form and neat habit.

Margarette (Henderson).—A blue flower of tolerable form and good habit.

Jetty Treffz (Henderson).—A neat delicate lilac flower, slightly edged with lavender, and small disc. Habit and form excellent. The rich silky texture of this flower makes it very interesting. A.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR JUNE.

FLOWER GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Plants in bloom are now so numerous that considerable discrimination will be necessary in furnishing this house. Avoid crowding the plants; by every means, and by frequent re-arrangement of the plants, endeavour to keep up the interest as much as possible. Remove decaying plants directly they become shabby, and attend scrupulously to cleanliness in every part. Guard against insects by timely fumigation, or washing, and also against mildew upon plants subject to it. Train creepers, and regulate the growth of those plants growing in the borders. Water copiously, both at the roots and with the syringe; and give the plants occasionally a good soaking of liquid manure. Ventilate freely, both by night and day; but avoid cold draughts through the night. Some of the Camellias will now have completed their growth, and, therefore, may be removed to a shaded place in the open air, as may also Acacias, and other large plants growing in pots or tubs.

Orangery.—Pursue the same general treatment as last month, maintaining a brisk moist temperature, and water copiously at the roots with liquid manure. Where young plants are growing freely, stop the stoutest of the young shoots to make them branch. Early fruit will require thinning, and where weakly trees have set, or are setting a heavy crop, it will be advisable to give a slight thinning at once. Give a little night air, but not too much for the present. A.

Orchid House.—Continue to pot and shift, according to former directions, and you have nothing to fear but that you will be able to compete with anybody, as regards health and vigour, if not in size; for that, wait a little longer, and your object is achieved. Take great care not to saturate the plants at the root in dull weather, but keep a nice humid atmosphere, with a temperature of about 70 to 80 degrees. Be very cautious that the plants are not burned by strong sunshine after a few dull days, as is frequently the case; rather shade an hour too early than a minute too late, and, at the same time, give them just what Mr. Spencer objects to give to his Vines, namely, a vapour bath. The moisture of the atmosphere is a matter too little attended to by many who profess to grow this singularly interesting tribe of plants; but a moist atmosphere in the growing season is the mainspring of success in the cultivation of Orchids, and inattention to it must result in comparative failure. For the same reason, always avoid lofty houses; for in such it is impossible to grow these plants successfully.

Stove.—In this house all should be clean, and the plants vigorous. Let there be no jumbling together; rather remove to pits or frames, or throw away altogether, anything that tends to injure a fine grown specimen. These must all stand quite free; and never forget that twenty good plants, well selected and grown, are far better than double that number of ill managed things. Let nothing be stinted for want of timely shifting. Guard against Thrip and Red Spider among young stock in the dung frames, and watch daily for their appearance upon Echites, Dipladenias, Gardenias, and Rondeletias, and carefully wash them off with a very soft sponge. This must be persevered in to the death. Give plenty of weak liquid manure to all strong-growing plants, as Clerodendrons, Hedychiums, Alpinias, Aristolochias, Stephanotis, Allamandas, and all similar fast-growing plants. Use the syringe freely, but with cautious force, in this house, as a preventive against insects. Should the Green-fly make its appearance upon any particular plant, take it out, and wash it clean off, in order to avoid, as far as is consistent, the use of fumigation, which is a great annoyance both to the plants and ourselves. J. G.

GREENHOUSE HARD-WOODED PLANTS.

Now that all danger from frost is over, most of the large specimens will do best placed out of doors in rather a sheltered, shaded situation. A screen formed of some free growing things, such as limes or privets, answers the purpose well. It is quite as important a matter to have good summer quarters for plants as a good house for them in winter. After standing them

out for a week or two, shift any that require it. If the weather should prove wet, turn them on their sides to prevent the soil in the pots from becoming saturated. This treatment applies only to the stronger growing and more hardy sorts. Such things as Boronias, Croweas, Chorozema Henchmanni, &c., ought to remain in the house. The young stock should also have the protection of a pit or cold frame during the day; tilt the lights at the side, and shade slightly in bright sunshine, water early in the afternoon, and give a gentle sprinkling overhead, then reduce the air to two or three inches at the back of the frame, and allow it to remain on all night unless it should be very cold. Examine the flower heads of the different sorts of Kalosanthes, and should they be infested with green fly, apply some tobacco water with a small brush and syringe, then, afterwards, these plants should be neatly tied before the bloom gets too forward, as they are apt to break down with their own weight. Most of the Epacris, and other early flowering plants, should be already shifted and fit to stand out of doors. Look carefully over them, and stop any shoot that seems to be robbing its fellows. This should be attended to, as stopping them after this month often spoils the appearance of the plant. Crowea saligna, if started in heat early in spring, will bloom a month sooner, if the extreme points of the shoots are taken out. Towards the end of the month many of the plants that were first potted, will be ready for another shift. If you wish to make very large plants of them, let it be done forthwith; but if only moderate sized specimens are required, they will no doubt bloom better left as they are.

Azaleas.—Here the directions given last month must be attended to. Young plants of new kinds, that it may be desirable to increase in size as much as possible, should be kept in the closest part of the house, and well shaded, the large specimens require less shade. Give them all a good syringing twice a day, and shut the house up early in the afternoon with plenty of sun heat.

Camellias.—Some of the early flowering sorts will now show their bloom-buds. If wanted in bloom early they must still be kept warm, but reduce the syringing in order to secure a drier atmosphere, for if kept too moist it will induce a second growth, which generally spoils the bloom. Prepare some strong turfy peat and loam for potting them next month, about three parts of the former and one of the latter is the best soil for them.

Routine.—Attend to weeding and cleaning the plants, whether in or out of doors, and loose no opportunity for tying, stopping, or otherwise regulating their growth. Turn them round frequently and examine them minutely for insects. Should red spider appear, lay the plant on its side upon a mat, and syringe it heavily; for green fly or thrips, fumigate without delay; but for scale *bury the plants at once* in some convenient corner. J. F.

Heathery.— The early plants are now in full splendour, amply repaying the attention they have required through the winter. Attend cautiously to watering, using weak liquid manure, especially to those plants which have not been potted this season. Stop rude and unnecessary growth in time, and search closely for insects and mildew. Some of the early plants, which have done blooming, may be removed to the open air. Divest them of their flowers, and, where necessary, cut them in to make them form fresh growth. Avoid crowding the plants; in fact, place them so as to allow of a free and uninterrupted current of air on all sides. Ventilate freely, both by night and day; and place plants intended for exhibition in the open air for three or four hours daily, and you will then get the full colour of the flowers.

Young stock in pots will now be growing vigorously. Attend to stopping the shoots in time, and peg or tie out the branches so as to form a bushy plant; for upon this first process much of the future success in forming a fine specimen depends. Some of the free growing kinds will require re-potting towards the end of the month; let them be attended to in time. J. F. C.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—As the season is now getting advanced great care must be taken that the plants are not allowed to get dry, water liberally so as to wet the whole of the roots, but do not water any but those which require it, as one extreme is as bad as the other, particularly for the more delicate kinds. Keep all decaying leaves removed. Manure water may now be given with great advantage when the plants are in a free growing state, which will much invigorate them, and make them throw up strong trusses. Strike cuttings of the most esteemed kinds so as to secure strong plants for the ensuing season. Put gauze or canvass inside the sashes to keep the bees out. Ventilate freely, but do not allow a current in the event of high winds.

Fancy Pelargoniums.—Do not water these so liberally as the foregoing, or they will shank off. Be careful to see that they are dry before watering; weak liquid manure may be beneficially given to these, two or three times a week. See that no decaying leaves are left in the middle of the plants, which collect damp, and often cause the loss of a branch. Support with a few sticks if not previously done. Remove the flowers as they decay which will add much to the appearance of the plants. Place a few of the most esteemed kinds in a pit or house where the bees can fertilize them for seeds, and the result will be many showy and perhaps new flowers next season.

Calceolarias.—As these are now coming into flower, they must be carefully looked to. See that they are free from insects, if not, fumigate and syringe to cleanse them. Support the shoots with sticks; give a little weak liquid manure occasionally; and remove all decaying and small leaves that are near the surface of the soil, to prevent their damping off.

Chrysanthemums.—Now is a good time to commence the propagation of these useful autumn plants, and cuttings of the leading shoots struck now in a gentle hot-bed, and grown vigorously, will be found to make much more useful and handsome plants than those worked at an earlier period. Plant out the old stools, allowing sufficient room to admit of the branches being layered into pots in the autumn, so as to provide compact dwarf plants.

Cinerarias.—Select some of the best kinds and place by themselves for seed, which must be carefully looked after. Sow some as soon as collected in a cool frame or house. Cover lightly and see that they do not get dry, as they will be found to vegetate quickly. When up give plenty of air so as to keep them dwarf. When large enough prick off thinly into store pots, where they may be allowed to remain until they are large enough to pot off into separate pots. Plant such as are wanted for stock in the open border, where they will throw up suckers, which may be taken off and potted as soon as large enough.

Fuchsias.—If not previously done, give these a final shift into a good rich compost, support the branches with sticks, higher than the plants, so that they may be tied as they grow. Supply liberally with weak liquid manure, and shade through the middle of the day when the sun is powerful, syringe occasionally to keep the plants clean, for on this much of your success depends.

Routine.—Prepare soils for autumn use, procure stable manure, and when well worked, make a heap of equal parts of it and good loam, when the whole will

ferment together. After it has been mixed two months, turn it, and add a little rotten cow-dung in the process. This with a little peat or leaf mould will be found a good compost for most soft-wooded plants. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

The forms and figures of our flower gardens, however good the arrangement of the plants may be, are but very imperfectly seen, as yet, through the effect of colour; indeed, the beds still wear a very incomplete appearance, and will continue to do so, until the individual plants, which are distributed over the beds, are sufficiently grown to meet one another, and pass through, and intermingle with each other; when there will be seen a oneness of expression in the beds, and a harmony and tranquillity conspicuous in the whole figure. This effect will be all the more striking, as studied care has been taken in the arrangement of the plants and colours, to sufficiently fix the attention on each bed of colour, so that the eye may rest there, until it has determined something of the colour, before it passes on to the next mass in the figure. This is what may with propriety be termed an intelligible arrangement of colours, because, a knowledge of the parts necessary, leads us to an acquaintance with the whole. On the other hand, if variety has been introduced into our flower gardens, to the neglect of expression, and those points of rest indispensably necessary to all kinds of composition, as well as flower-gardening, there will not be observed any distinction worth mentioning among the parts, but rather a kind of sameness of feeling resulting from looking at the whole. This is the work of small artists; it is endless in variety, but ending in nothing. That fullness and regularity, so essential to a beautiful effect in our flower-gardens, is what haunts the anxious gardener by day and by night, and, therefore, his mind rests not until these effects are observed in the flower-garden; and hence the necessity of all those means at our command, to perfect the forms and colours of the masses. And, with a view to this, notice the relative difference among your bedded plants, and treat them accordingly. Some may require a partial shade in bright sunshine, and others, if exposed to currents of cold dry air, Verbenas in particular, grow fast by this treatment. Use water from tanks and ponds exposed to the sun, and apply it at night, and effectively too, rather than often. Attend to stirring of the soil amongst Calceolarias, and let the sticks be neat with which you stake them, and also of a green colour, like that of the leaves of the plant. Plants being light followers, we may take advantage of this tendency, by pegging them from the light, to cover the ground with lateral branches. Verbenas, Ageratums, Petunias, and Anagallises may be treated in this way. Plants interlacing the meshes of basket-work, require continual attention, not only as regards watering, but in training and directing their shoots, so as to give a regular surface of flowers to the sides of the baskets. If any vases are still unfilled, contrast the colour of the plant with the vase, and cover the soil with some of the spreading Lobelias. Set out Orange trees in their places, and water them at times with liquid manure. Keep all rambling, growing creepers within due bounds. Remove Stocks, China Asters, Zinnias, and Marigolds to their appointed places, and sow annuals for autumn flowering.

Propagation.—Iberis saxatile should be increased abundantly by cuttings, which are readily rooted under a hand-glass, placed in a rather shaded situation: it is a beautiful plant for an edging, or distributing about the groups on the grass, and may be cut like Box edging. Auhretias, and many other spring flowering plants, should be divided at this time, and planted in the reserve garden. J. C.

Rose Garden.—This being the month that principally rewards the cultivator of Roses, spare no pains at the beginning of it to remove any bad shaped flower buds; regulate and tie up any weak growing shoots, or clear away any insects, so that there may be no impediment to their bloom being as perfect as possible. Go over them every morning while in bloom, and take off all the faded flowers, and also the hips or seed vessels. The Perpetuals, or autumn flowering kinds, as soon as the bunch has expanded all its flowers, and begins to fade, should be cut down to the most vertical eye, which by this time will, in all probability, have made a start; and, should the weather be dry, the surface of the soil should be lightly stirred, the ground saturated with manure water, or, where that cannot be had, some guano should be scattered over the surface after it is stirred, and then any soft water may be applied; the strength of the guano will then be carried to the roots with the water.

The frosts on the 2nd and 3rd of May have been very injurious to the young shoots in many situations; where that is the case, it will be well to encourage any new shoots that may come from the main branches during the summer, so that there may be as much healthy wood as possible for another season.

Keep all wild shoots cut off as soon as they make their appearance, and keep the ground perfectly clear of weeds and litter.

During the blooming season, those who wish to add to their rosetums should visit the various collections that are cultivated for sale, so that they may make their own choice; but it will be well to ask, if the state any particular variety is seen in, is its general character; as Roses vary very much, particularly some kinds. Towards the end of the month many shoots will be firm enough for budding, and many kinds will give no better buds for working than those on the flowering shoots, which must be taken before the flowers are quite done, or the wood will adhere to the bark too much to be separated readily. In selecting shoots to take buds from, take those that are of moderate size, avoid the very strongest, clean off the thorns, and cut the leaves off, leaving about half-an-inch of the petiole to take hold of; then with a sharp knife take out the bud, beginning about half-an-inch above the eye, and cut clean through, about half the thickness of the shoot, bringing the knife out about the eighth of an inch below the bud; then, with the point of the knife, separate the piece of wood left in from the bark, and divide the small piece of wood that goes into the eye, without loosening the part that is to remain, and leaving sufficient wood, that, when the bud is inserted, it may touch the wood of the stock. Then with the point of the knife (having previously removed the thorns from that part of the shoot where the bud is to be inserted) open the bark of the stock, in the most convenient part of the shoot, from the stem towards the top in a straight line, long enough to put in the bud, and with the footstalk of the leaf that is left push the bud down as close to the stem as possible, and with a piece of soft bass, or what is better, carpet worsted, tie it in, leaving the eye so that it may be just seen, and leave it to itself for three weeks or a month, when it may be loosened a little. When the buds have been sent a distance, or when, from any other cause, they will not run—that is, the bark will not part from the wood readily—they may be pared down as thin as possible, and put in without taking the wood out; but they make much the neatest plants when the wood is taken out. Look after the growing shoots of last year's budding as they will want frequently tying. H. M'M.

Arboretum and Shrubbery.—Here, for the present, the work will be principally routine. Attend to watering, staking, and mulching newly planted trees, remembering that a good soaking, so as to wet the soil

thoroughly, is better than constant waterings. As the Rhododendrons, Azaleas, and other American plants go out of bloom, divest them of their seed vessels, and if necessary, give a good soaking of manure-water; that prepared from cow-dung is the best, especially upon hot soils. If no other material for mulching can be procured, short grass placed over the borders, or around single specimens, will answer perfectly. J. C. R.

Carnations and Picotees.—These, as they advance should be tied to the stakes, reducing the number of shoots according to the strength of the plant, regarding as well the stock you possess of each particular sort. Should any symptoms of green-fly appear, the plants should at once be fumigated. Weak manure-water may, with advantage, be applied once a-week.

Dahlias, planted the end of last month, should be encouraged into good growth, by watering them overhead of an evening with clear soft water, stirring the soil often, or much of the benefit derived from the watering is lost. A further supply may still be planted, with every probable chance of blooming well for the late exhibitions. Attend regularly to the tying, and search diligently of an evening for slugs, and early in the morning for the earwigs; bearing in mind that they cannot be too closely looked after, even though they may appear to be doing no mischief just now.

Hollyhocks.—Strong plants of these should now be thinned of their flowering spikes, if wanted for exhibition, leaving only one or two on each plant. The weaker growing ones should be encouraged by stirring the soil about them, and with an application of liquid manure. Seedlings that were raised in heat in April, and hardened off, may now be planted two feet apart.

Pansies struck from cuttings in April and May will produce fine blooms, if planted in a shady situation, or potted into six-inch pots, and shaded, as the state of the weather may require. Examine the seed beds, and take cuttings from those of great promise, throwing away the inferior ones, as a preventive of any good flowers being injured that it may be desirable to seed from. Attend to watering, propagating, shading, &c.

Pinks.—Presuming these have been tied up, and the shoots thinned to two or three on each plant, as recommended last month, these shoots should now be disbudded, leaving only one on each stem, if fine blooms are a desideratum. The pods must be tied, to prevent splitting. Pipings may now be made, and struck under hand-lights. Water, and shade from the sun.

Phloxes.—The advancing shoots should now be secured to stakes, to prevent the action of the wind damaging them; the soil frequently stirred, and not allowed to suffer for want of water. The varieties of P. Drummondii may now be planted out, carefully guarding against the attacks of slugs, &c., to which they are very subject.

Ranunculuses.—As these begin to show colour, the awning by which they are to be shaded should be placed over them. Where nothing of this sort has been provided, a few sticks hooped over the beds, and mats thrown on the sunny side for a few hours each day, will be of great service in prolonging their beauty, which, when left to their fate, is of very short duration. Attend to the watering, but discontinue as they show symptoms of decline, and take up as soon as perfectly faded, as a few hours' rain at that period often excites them into fresh action, which tends to injure the roots for the succeeding year.

Tulips.—Previous to the declining beauty of these see that the names are correct, and the places in which they are to be stored correspond. The covering should be taken away a few weeks before the bulbs are taken up, which will give air and light, and hasten the ripening. Where seed is not required, the heads should be broken off to give strength to the bulb. T. B.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—The continuance of frosty nights and cloudy cold days, producing a temperature many degrees below the average for the season, will render fires in this department still necessary. Some of the early fruit will now be ripening, allow them a liberal admission of air, and expose them entirely to the light; the perfect colouring, and consequent high flavour of Pines, is much improved by a considerable exposure to light, and air, particularly after indications of changing colour are perceptible. Fruit still swelling will require watering, once or twice weekly; and to be kept in a moist growing atmosphere. Remove all successional growths of suckers, and see that each fruit is kept in an erect position.

Plants which have been kept back for the autumn supply, should now be induced to fruit, and as they have now completed their first growth, they will generally do this without much trouble. Those which appear backward in fruiting may be kept dry for a short time; this, and fully exposing them to the light, will in most cases make them fruit. After the fruit is perceptible those requiring fresh pots should have a shift, and at once be placed where they are to ripen their fruit, which from this crop may always be expected to be fine. The most suitable kinds for autumn and winter use are the two varieties of Cayenne, Black Jamaica, and a few Queens. When ripe fruit is required next April and May a portion of the stock should now be selected, and receive their final shift. As pines ripening early I may name The Old Queen, Prickly Cayenne (very good), and the Black Antigua. This batch will require growing on through August; and then if kept comparatively dry, with plenty of air, till towards the end of October, they may be expected to show fruit before the new year by giving them a gentle increase of heat in November, and will come into use when Pines are more than usually valuable.

Succession House.—All succession plants requiring fresh pots should now have them. When repluuging, allow sufficient room for the leaves to spread horizontally, and place them as near the glass as possible. Pines grown on the open bed, or Meudon system, will merely require attention to watering and the regulation of air, provided the bottom heat is steady. This simple and *natural* mode of cultivation should be put in practice whenever it is possible to do so. Weak manure water may be given to all the stock once a week or fortnight.

Vinery.—After the crop from the first house is gathered, bestow a little extra trouble on the foliage, and endeavour to keep the leaves green for two or three months to come. To manage this, considerable care is necessary, as it is by no means desirable that a fresh growth should take place; but, by gentle watering to the borders, the use of the syringe, to keep down spiders, and allowing plenty of air at all times, the leaves may be kept in a state sufficiently healthy to replenish the system with a large stock of organized matter, which will be found of the utmost importance to next season's crop. By these means, vines may be forced early for a long succession of years, without much diminution of their energy taking place. Keep those houses dry and cool where the fruit is ripe. Successional houses will require attention according to their several stages: look at our former directions. Mind this cold weather *all Vines* will be benefited by fire heat when in bloom, and Muscats, Sweetwaters, and some other shy setters, must have a temperature of not less than seventy degrees to set their fruit with certainty. When Vines, recently planted

and not yet in a bearing state, are in progress, pay particular attention to their leaves, and allow them for the present to make all the growth they can. Water inside borders. Vines training in pots for next season's fruiting will want daily attention; stop them when they are two or three feet longer than the length you require for fruiting, stop the laterals, and allow the principal leaves full exposure to the light. If the pots are full of roots allow them manure water once or twice a week.

J. S.

Figs.—As soon as the first crop of fruit is cleared off, pay particular attention to the second crop, which may be lost at this stage by neglect. Give the borders a good watering, and to those in pots give plenty of liquid manure. Syringe the foliage freely to keep down the red spider, and maintain a moist atmosphere. Give plenty of air during the early part of the day, always shutting up early in the afternoon, and well wetting the borders, floors, &c. See that too many fruit are not left on for a second crop, and that the branches are not too crowded.

Peaches.—When the fruit is all taken off, the principal point to be attended to is the ripening of the wood—a very important one, as on it depends, in a great measure, the success or failure of the next season's crop of fruit. Not a single shoot more than will be required at the winter training should be retained; and the trees should be well washed with a syringe or engine to cleanse the leaves from any filth that may have collected on them during the ripening of the fruit. The ripening of the wood will entirely depend on the healthiness of the leaves, and on their duly and properly performing their functions. Whatever, therefore, tends to impede the free action of leaves, tends also to diminish the ripening of the wood. It thus becomes of the utmost importance to keep the leaves in a healthy condition up to the time of their natural decay. Keep a moist atmosphere in houses where fruit is swelling; water freely; give air early, and abundantly in the forenoon; shut up early in the afternoon, syringing the trees at the same time, and well wetting the borders.

Strawberries.—I have sometimes got a good crop of very late fruit, by planting out in a south border those plants which were forced very early. Those who wish for good plants for early forcing next season, should lay, in small pots, the first runners that can be had. M. S.

Cucumber House.—As the weather continues cold and unkind, you must not relax in due attention to the heat, air, and moisture. This is likely to prove an expensive spring in the forcing department. I am consuming as much firing at the present time, and have been, for the last fortnight, as I did in February, and it is difficult, with such continued fire-heat, to keep free from insects. Abundance of water sprinkled in every part of the house frequently, and a rather low night temperature, is the only preventive, coupled with healthy development of the plants. If any new kinds of Cucumbers are to be tried, with a view to the saving of seed, they must now be attended to, or there will not be time to give them a fair trial. Pay strict attention, at least twice a week, to regulating the plants, and whenever there is a leaf that shows signs of bad health, remove it, as decaying leaves form the best harbour for vermin.

Dung Beds.—All previous directions must be attended to; keep the linings well made up, to keep a sweet growing heat. Earth up, and peg out the shoots of growing plants. Surface old beds with fresh soil, for the double purpose of cleanliness, and to invigorate the old plants that have long been bearing fruit. In old beds that have been worked for some time with hot linings of dung, a good soaking with tepid water round the back and front of the frame, will be a means of preventing the soil and dung becoming dry and burnt. Avoid over cropping, and keep the plants thin of foliage. The plants on the ridges will not require much attention at present, except for air and water. If the nights are cold, a covering of mats will be of service.

Melons.—Previous directions must be attended to. Keep the plants thin, give abundance of air on fine days, earth up growing crops as they advance, do not stop the plants, until they reach the sides of the pit or frame, for the less the plants are mutilated in their first stage of growth, the better, as they are at all times liable to canker. When the fruit is set, and swelling, give liberal waterings with tepid water, but at all times avoid, as much as possible, wetting that part of the stem near the seed leaves, where the shoots branch from, and if any canker appears, carefully scrape the loose part off with a knife, and apply hot lime to the wound, which will assist in drying it up. If the plants are in a healthy condition, after the fruit is cut, by applying fresh linings, and soaking the beds with water they will start afresh into growth, and soon set another crop of fruit; although not so fine as the first, it will be very serviceable when ripe. There is yet plenty of time to secure a fine crop of any of the most esteemed varieties of Melons, by sowing at the present time, where there is materials and convenience. I have cut excellent Melons in a hot water pit in October and November, by sowing in the middle of June, and growing them upon brush-wood, such as old pea stakes &c., so as to keep the stems dry. W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

Peach and Nectarine.—Continue to pay attention to stopping and laying in the shoots. Should any of the leading shoots appear to be growing too vigorously, stop them as soon as you perceive it, they will then throw out laterals. If this operation is not performed early in the season, the shoots do not get properly ripened. Partially thin the fruit if set too thickly, before stoning; the final thinning should be left until after this process has taken place. Water and mulch newly planted trees if not done before, and all the trees should occasionally have a good washing with the engine, using only clear soft water; unless red spider or green fly makes its appearance, when a little sulphur may be used with the water to destroy the former, and a little tobacco-water for the latter. In watering the roots of the trees let it be done liberally, so that it does not require doing frequently, and at the same time lay litter of some kind, or lawn grass will do, to prevent evaporation, for when this takes place to any extent, it produces a degree of cold to the roots, which is prejudicial to them.

Apricots.—Finally thin the fruit when the process of stoning has taken place. Stop vigorous shoots to cause them to throw out laterals, which will be of more moderate growth. See that the trees do not want for water when the fruit is swelling off. The observations made above as regards watering, hold good in all cases, whether for fruit-trees or vegetables.

Cherry.—Net the trees as the fruit progresses towards ripening; but before doing so, it is necessary to go carefully over them, and stop and lay in all the shoots that require it. Should the trees be attacked by black fly, either cut off the ends of the shoots if very bad, or dip them in tobacco-water. It is generally only the ends of the shoots that are attacked.

Fig.—Stop the shoots as recommended last month. Lay in the leaders, and those shoots that are required for filling up. Watering the roots with soap-suds will be found to greatly benefit the tree and fruit.

Apple and Pear.—Those fruit-trees, either espalier, wall, or pyramidal, must have due attention paid to them in stopping, to produce well ordered and prolific trees. If the fruit sets too thickly, divest the tree of a portion of it.

Plum.—Stopping and nailing in the shoots that are required, must still be persevered in.

Vine.—Pay due attention to stopping and nailing the shoots to the wall. As the Vine is generally grown, it is scarcely worth the space it occupies, but by careful attention it may in most seasons be ripened sufficiently for the dessert.

Strawberry.—To grow this fruit to perfection, it is an essential point to keep the root moist while it is swelling. When the plants are watered give them a most liberal supply, and, if not yet done, mulch with long grass, straw, or long litter of some kind, but not with the mowings of the lawn, for reasons before stated. This mulching will prevent the rapid evaporation which would otherwise take place, and also serves to keep the fruit clean. To accelerate the ripening of a portion of the fruit for early use, lay pieces of slate under some of the best fruit. Roberts' tiles are no doubt very useful, but from their lighter colour, and their greater porosity, they do not attract or absorb heat to the extent that slates do. Pinch off all flowers that may appear on the *Alpines* this month. This being a fruit that requires careful packing, if to be sent any distance, it may be useful to some of our readers to describe my mode of doing so. I have small baskets with lids made of a sufficient length to fit in the width of a large hamper; the width of the baskets are about six inches, and the depth about four inches. In the first place I put a few of the young tender leaves of the Strawberry at the bottom of the basket, I then very carefully fill up the basket with fruit and leaves, putting in a few of the latter occasionally, not putting them in layers, but intermixing them with the fruit; when the basket is sufficiently full, I put a few leaves on the top of the fruit, and tie the lid down securely; I then place them one on the top of the other in a large hamper. It is particularly necessary that the fruit in a bruised or over-ripe condition should be excluded. Some judgment is required in packing, which can only be gained by experience. H. C. O.

KITCHEN GARDEN.

The main crops of all the various kinds of vegetables having been sown, the principal work now will be to thin them in time, making good all vacancies; to guard against their suffering from insects, and to keep hoeing among them so as to promote healthy and vigorous growth. Prick out in nursery beds all the various kinds of Brocoli, Savoys, Brussels Sprouts, Borecole, Cauliflower, and the like, also Celery, and such other plants as require that treatment. Plant out immediately the first crop of Celery in well manured trenches; and a good breadth towards the end of the month. Plant Lettuce, and other salad plants between, also Spinach for summer use. Sow Lettuce, Endive, Radishes, and other salad plants, twice in the month; also Cauliflower and Cape Brocoli for succession, and a good breadth of Chappel's Colewort for early winter use. Turnips of the stone kind may also be sown about every fortnight, and where young Onions are much used, another bed must now be got in. Sow, likewise, successional crops of Peas, Beans, French Beans, and Scarlet Runners. Water with manure water, mulch those crops already sown, with short grass, if manure cannot be spared, and sprinkle them with soot to keep insects, &c., from preying upon them. Plant a good successional crop of Cauliflowers in deeply trenched and richly manured ground; and clear, manure, trench, and plant out all the various kinds of Brassicæ as soon as the plants are large enough. Herbs, such as Marjoram, Basil, &c., must be attended to. Train and stop the Tomatoes as they require it, giving them occasionally a good soaking of manure water. Spawn the Mushroom bed last made as soon as ready, and prepare dung for another bed. Recollect the old saying about sowing thick and thinning early, but never mind about currying favour from the cook, rather endeavour to place that functionary, *hors de combat*, by providing a plentiful supply of everything. Look to former directions, and see that you have not neglected anything. J. C. S.

WILD FLOWERS OF JUNE.

With the advent of the summer season, the number of new flowers, and the quantity in which each occurs increases day by day, a large proportion of those plants coming into blossom in June, continuing to blow for several months. The proper May flowers, will, many of them, appear as June flowers this season, as all our indigenous plants seem backward this year, at least, in the neighbourhood of London.

Of those to be particularly looked for in June, the following may be named: Ranunculaceæ, most species of *Ranunculus*, *Thalictrum*, *Aquilegia*. Papaveraceæ, Fumariaceæ, Cruciferæ, Caryophyllaceæ, Hypericaceæ, Geraniaceæ, and most of the allied families. Many of the Leguminosæ and most of the Rosaceæ. The species of *Sedum* and some of the Saxifrages. The Umbelliferæ present many flowers this month, but become more fit for botanical purposes later in the season, when the fruits begin to ripen. The Monopetalous families are, in general, later, but still a great many of them contain early plants, particularly the Primulaceæ, with its species of *Lysimachia*, *Anagallis Hottonia*, and others. The allies of the dead nettles, *Lamium*, *Galiopsis Stachys*, together with *Ajuga*, and later, *Salvia*, represent the Labiate family pretty fully; while among the Boraginaceæ we have many species of *Myosotis*, *Lithospermum*, and, indeed, most of the genera. The Orchidaceæ and Liliaceæ are now at their best; and the Grasses offer a wide field of observation to the student, in the curious structure of their plain and unattractive looking blossom, which it behoves the botanist to avail himself of, before the scythe leaves him but the denizens of the hedge-rows and woods.

The general characteristics of the vegetation during June, are those of a period of change; the familiar spring flowers, which in many cases still display themselves till the end of May, now begin to disappear altogether, and while the number of plants really in their prime in June, is perhaps small, the list of flowers becomes very large, from the unfolding of so many of those species which last through all the summer months. Those who would reside in, or can visit the chalk districts in June, should lose no opportunity of searching for the rare Orchidaceæ. But we would suggest that it is not absolutely necessary to dig up the roots of all those specimens where these are already well described in books, for these plants are becoming much more uncommon every year. This is, however, undoubtedly more owing to the invasions of the London hawkers, than those of botanical collectors, for basket loads of Orchis roots are carried about town for sale every spring. We warn metropolitan botanists not to encourage this species of free trade unless they are willing to risk the extirpation of these interesting plants from their botanizing grounds.

To all who love flowers, botanists though they may not be, nothing can be more delightful than to note the rapid increase of gay colours and curious flowers permitted to grow in lanes and hedge-rows during this month, and writing, as we do this, in the midst of the dust and smoke of London, we have somewhat of a feeling of envy of those who live with the woods and

fields about them, which we can but see and enjoy in hurried excursions. A. H.

ANIMAL KINGDOM.

Ornithology.—June is a busy month with our little feathery friends, there is more work and less singing, their time is almost entirely employed in providing for the wants of their infant families, and what a wide and interesting field of observation there is here for the inquiring mind. From the mighty Eagle who rears her young on the mountain top, to the little Swallow that constructs her clay-built house in our window corners; how varied are the forms and materials used by birds in the construction of dwelling-places for their young. To watch the erection of one of these little houses is highly interesting; to see how perseveringly they work from the laying of the first straw until the placing of the last feather, when their home is ready to receive those little germs which, nurtured by a mother's breast, in due time burst into life. Poor helpless things, how short would be their existence but for a mother's care; she appears to live for them alone, and would freely sacrifice her own life for their safety. We were once like her callous brood, poor, helpless things, dependent on a mother's love, which, in after life, is often but poorly repaid, more to our shame, for the name of mother should be to us as a holy word.

In the examination of the nests of birds, the most careless observer cannot fail to be struck with the fact that the generality of our resident birds construct nests considerably warmer than those that are only summer visitors. Take, for example, the nest of the house Sparrow (*Passer domesticus*), and compare it with that of the Black Cap (*Curruca atricapilla*), or Garden Warbler (*Curruca hortensis*); the former is a large mass of straw, hay, paper, thread, and other miscellaneous articles, and warmly lined with feathers; the latter, only a few rooty fibres, so sparingly used that the eggs may be seen through both the bottom and sides. This is one of Nature's secrets; here is a bird that resides with us during the year constructing a nest, the heat of which must be like that of an oven, while the one that flees from our shores at the first breath of winter, only requires one of so frail a nature that it barely supports the eggs. This is certainly a mystery, and one, with all our boasted knowledge, we are unable to solve.

Towards the end of the month, the gardener will be rather annoyed by the frequent visits of various species of birds to all the smaller kinds of fruit that are just beginning to ripen; amongst the visitors will be found the following birds:—The Black Cap, White Throat (*Curruca cinerea*), Garden Warbler, Lesser White Throat (*Curruca garrula*), and Robin (*Erythaca rubecula*), who is the most destructive of the whole, and of so jealous a disposition that he attacks and drives every bird away that attempts to invade his territory; the veneration in which he is generally held is his protection, and the less guilty bird is often sacrificed for depredations he has committed. Amongst the early cherries, the Blackbird (*Merula vulgaris*), Starling (*Sturnus vulgaris*), and Sparrow (*Passer domesticus*), are the most destructive, the two former carrying the fruit away whole, the latter so disfiguring it as to render it useless; these depredations are at times rather considerable, but still we say spare the depredators, for has not the Blackbird cheered us with his song; we admire the Starling for his sociability; and is not the Sparrow our fellow-lodger, dwelling with us under the same roof. H. W.

Entomology.—This is *the* month in which the entomologist will be sure to obtain the most abundant supply of insects, more especially among the Beetles (*Coleoptera*), and Butterflies and Moths (*Lepidoptera*). He will, therefore, now find the fullest employment, either in the capture of the objects of his pursuit or in setting them, that is, in expanding their wings properly and drying them for the cabinet. For the amateur, a gauze bag, about half a yard long, and about a foot in diameter at the mouth, like a fisherman's landing-net, only lighter, and with a long slender handle, is sufficient; but the professed entomologist needs a regular net, which is made like a bat fowling-net, being a sheet of gauze net about a yard wide and a yard and a half long, with its long sides and top lapped round two slender handles, each bent at an angle towards the top. The bottom of the handles are held in the hands with the net outspread, but as soon as the insect is within reach the two sides are brought together (in the same way as we shut a book), and the insect caught within the bag thus formed. If delicate, and likely to die immediately, or to rub itself to pieces before reaching home, the insect must then be killed by a sharp pinch on the breast, and a pin passed through the middle of the back, and then transferred to the corked pocket collecting-box; but the better plan is to place each insect in a separate box (pill-boxes are the best things for small ones), and not to kill them till arriving at home, when the fumes of a few lucifer matches will instantly, and with the least amount of pain, put an end to their existence. They are then pinned and laid out on thin pieces of cork or setting boards, and their wings kept properly extended whilst drying by means of thin triangular braces of card. When dry (and they must not be removed until they are thoroughly so) the braces may be removed, the wings will remain properly extended, and the specimens are ready for the cabinet, the drawers of which must be kept camphored, and must not be made of cedar wood. Small insects are fixed with gum arabic upon slips of card. I have given these instructions in as short and condensed a manner as possible, knowing that many persons are deterred from collecting from not knowing how to set about it effectually, whilst hints like these will be sufficient to give any one an idea of the modes adopted by entomologists in forming and preparing their collections.

The period for collecting the first brood of Caterpillars still continues, and now, from the growth of many of the insects, they, or at least their ravages upon our vegetable productions, become more evident; now the Apple, Damson, and other fruit trees are devastated by the Caterpillars of the Lackey Moth, which live in large societies, forming webs of large size on the branches and twigs, inclosing therein a quantity of leaves, upon which they subsist for a time, and then passing to some other adjacent twig. Now the singular twig-like Caterpillar of the Swallow-tailed Moth is found on the Apricot, surprising the uninstructed by its remarkable power of muscle, enabling it to keep itself rigidly outstretched at all kinds of angles for a great length of time, holding on to the twig only by its hind pair of legs, and then, when danger is over, creeping away with the oddest possible kind of movement, like a pair of animated compasses, whence this class of Caterpillars have been termed Geometers or Loopers. Now, also, our Currant-bushes are devastated by the prettily-spotted Looper Caterpillars of the Magpie Moth, a very good plan for the collecting and destroying of which was some time since published in one of the daily journals. "A gardener at Glasgow has a mode of destroying Caterpillars which he discovered by accident. A piece of woollen rag had been blown by the wind into a Currant-bush, and when taken out was found covered with those leaf-destroying insects. He immediately placed pieces of woollen cloth in every bush in his garden, and found the next day that the Caterpillars had universally taken to them for shelter. In this way he destroyed many thousands every morning."

The different species of Daddy Long-legs (*Tipulidæ*) also make their appearance in the perfect state about

the end of the month, and as their larvæ are amongst the most rapacious of all the gardener's enemies, feeding, as Black Grubs, upon the roots of his choicest plants, and at the same time amongst the most difficult to destroy whilst larvæ, I would advise their destruction as soon as ever they appear in the winged state. In large establishments it would well repay the outlay to employ children with gauze bag nets to collect and destroy them.

Our selection of the June insects must be very condensed, and will include, as heretofore, only the more remarkable and most injurious kinds, or those which are most likely to fall under the observation of ordinary observers.

COLEOPTERA. CARABIDÆ, *Calosoma sycophanta.*—On oaks, feeding on Caterpillars. Very rare.

Calosoma inquisitor.—On white thorn, also feeding on Caterpillars.

Carabus violaceus.—In gardens, orchards, sand-pits, &c. Very common.

Carabus hortensis.—Ditto.

Brachinus crepitans (the Bombardier-beetle).—Under stones.

DYTICIDÆ AND HYDROPHILIDÆ. The species of these two families of Water-beetles are now very abundant.

BUPRESTIDÆ. *Buprestis biguttatus and viridis.*—In woods, on birch, and hazel.

ELATERIDÆ. *Elater pectinicornis, rufipennis, metallicus, bipustulatus,* and many other species.—In hedges and woods. The larvæ of some of the species of this family are known under the common name of Wire-worms.

TELEPHORIDÆ. Great numbers of species of *Telephorus* and *Malthinus* flying about hedges, gardens, and especially frequenting the flowers of umbelliferæ.

LAMPYRIDÆ. *Lampyris noctiluca* (the Glow-worm).—On banks, and at the foot of hedge-rows.

Malachius fasciatus, æneus, and other species.—On grass, and in hedge-rows, and on umbelliferous flowers.

NITIDULIDÆ. *Nitidula boleti, obsoleta,* and other species.—In decayed fungi.

Nitidula obscura, marginata.—In dry bones and dead animals.

PTINIDÆ. *Ptinus imperialis,* and other species.—In hedges.

Anobium striatum, and other species.—In houses. The larvæ known under the common name of the Death-watch.

DERMESTIDÆ. *Dermestes murinus.*—In dead animals, in woods.

HISTERIDÆ. *Hister unicolor, cadaverinus, 2-maculatus,* &c.—In ditto, and under dung.

LAMELLICORNES. *Melolontha vulgaris* (the Common Cock-chaffer), and at the end of the month *Melolontha solstitialis* (the Small Cock-chaffer).—In gardens and hedges.

Melolontha fullo (the Large-spotted Cock-chaffer).—On the south coast of England. Very rare.

Cetonia aurata (the Rose-chaffer).—In gardens.

LUCANIDÆ. *Lucanus cervus* (the Stag-beetle).—In lanes, and on old palings, flying in the twilight.

CURCULIONIDÆ. *Balaninus nucum.*—On nut trees, the larva is the White Grub found in the hazel nut.

Polydrusus argentatus.—On the oak.

Cryptorhynchus lapathi.—On osiers. Many small species of this and other genera of Weevils, found in hedges and on various plants.

CRIOCERIDÆ. *Crioceris asparagi* (the Asparagus-beetle).—On asparagus.

Crioceris merdigera.—On the white lily.

LONGICORNES. *Cerambyx moschatus* (the Musk-beetle).—On trunks of willows.

Clytus arietis.—On trunks of trees and umbelliferous flowers.

Callidium bajulum.—On palings.

Leptura elongata, and numerous other species.—On flowers, especially umbelliferæ.

CHRYSOMELIDÆ. *Chrysomela vitellinæ.*—On willows.

Chrysomela graminis and *marginata.*—On heaths.

Clythra 4-punctata.—On oaks.

COCCINELLIDÆ. *Coccinella ocellata,* 14-*pustulata,* and many other smaller species of Lady-birds.—In hedges and on plants.

HEMIPTERA. *Coreus marginatus* and *rhomboideus.*—In grassy places and hedges.

Capsus spissicornis, ruficollis, and a great number of species of Plant Bugs.—On various species of plants.

LEPIDOPTERA. *Colias Hyale* (the scarce Clouded Yellow Butterfly).—In clover fields.

Pæris cratægi (the Black-veined White Butterfly).—In woods.

Melitæa euphrosyne (the Pearl Bordered Fritillary).—On heaths and waste ground.

Melitæa Cinxia (the Glanville Fritillary).—In meadows.

Hipparchia hyperanthus (the Ringlet).—In woods and fields.

Hipparchia pamphilus.—On heaths and grassy places.

Hipparchia Ægeria (the Speckled Wood Butterfly).—At the borders of woods and fields.

Lycæna phlæas (the small common Copper Butterfly). On grassy commons and lanes.

Smerinthus populi (the Poplar Hawk Moth).—On trunks of poplars.

Deilephila elpenor (the Elephant Hawk Moth).—In marshy places.

Sphinx ligustri (the Privet Hawk Moth).—In gardens.

Macroglossa stellatarum (the Humming-bird Hawk Moth).—In gardens hovering over flowers.

Ægeria tipuliformis (the Currant Clear-wing).—On currant bushes.

Trochilium apiforme (the Hornet Moth).—On trunks of lime and poplar trees.

Zygæna filipendulæ (the common Burnet Moth).—In meadows.

Ino statices (the Green Forester).—Ditto.

Hepialus humuli (the Ghost Moth).—In churchyards and lanes, hovering over grass.

Cossus ligniperda (the Goat Moth).—On trunks of willows.

Stauropus fagi (the Lobster Moth).—On trunks of trees.

Hammatophora bucephala (the Buff tip Moth).—On trunks of trees and hedges of woods.

Callimorpha jacobeæ (the Cinnabar Moth).—In heathy lanes, and gardens.

Triphæna pronuba (the large Yellow Underwing).—In grassy places, especially hay-fields.

Acronycta Psi, tridens, and a great number of species of *Noctuidæ.*—On trunks of trees and palings.

Biston betularius (the Peppered Moth).—On palings.

Geometra viridaria, rubiginata, galiata, and a great number of *Geometridæ,* especially the species known under the common name of Carpet Moths.—In gardens, hedges, and skirts of woods.

Tortrix rosana (the Rose Tortrix).—In gardens.

Crambus pratorum and many other species of *Veneer* Moths.—On grass.

Pterophorus pentadactylus (the White Plume Moth).—On nettles and hedges.

NEUROPTERA. Most of the species of Dragon-flies (*Libellulidæ*), and many species of Day-flies (*Ephemeridæ*), are now found in the neighbourhood of water.

HYMENOPTERA. The numerous species of Saw-flies (*Tenthredinidæ*) and Sand-wasps (*Sphegidæ,* &c.), as well as the parasitic Ichneumon flies (*Ichneumonidæ*), now abound.

J. O. W.

C.J. Bowerbey, del. & lith.

Gesnera macrantha_purpurea

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GESNERA MACRANTHA-PURPUREA.

Nat. Order, Gesneraceæ.

Generic Character.—Gesnera, *Mart.*—*Calyx* with the tube adherent to the base of the ovary, the limb five-parted, almost unequal. *Corolla* perigynous, tubular, tube with five depressions at the base, limb rather two-lipped, the lower lip three-lobed. *Stamens* inserted on the corolla, four, didynamous, included, with the rudiment of a fifth; *anthers* two-celled, cohering into a disc, at length separating. *Ovary* adherent to the base of the calyx, surrounded by five glands, one-celled, with two parietal, two-lobed placentas; *style* simple; *stigma* capitate, obscurely two-lobed. *Capsule* coriaceous, one-celled, two-valved, valves bearing the seeds in the middle. *Seeds* numerous, rather club-shaped. Embryo orthotropous in the axis of fleshy albumen; cotyledons short, obtuse; radicle turned toward the hilum, centrifugal.—(*Endlicher, Gen. Plant.*)

Gesnera bulbosa, *Ker.*—Pubescent-villose; rhizome tuberous; stems herbaceous, erect, round; leaves opposite and ternate, petiolate-ovate, or obovate-elliptical, cordate at the base serrato-crenate; cymes many-flowered, pedunculate, or few-flowered, and subsessile by suppression, arranged in a terminal thyrse in the axils of the uppermost leaves; calyx shortly five-toothed; corolla cylindraceous swollen at the base constricted above this, and inflated towards the summit, the upper lip oblong, straight, two-lobed, the lower shorter, three-lobed, sub-recurved; filaments hairy, but glabrous at the bases and summits; style pubescent; perigynous glands two, dorsal, obtuse.

G. macrantha-purpurea.—(*Hort.*)—Purple-marked, large-flowered Gesnera. Hybrid (or variety?). The large scarlet flowers marked with purple in the throat.

Description.—A handsome herbaceous plant, about twelve to eighteen inches high, with large opposite leaves, and very showy flowers. Stem erect, and clothed especially in the upper part with a coloured pubescence. The leaves ovate-lanceolate, somewhat cordate, large.—some as much as nine inches long, and six inches broad,—crenate, stalked, covered with close, short, and rather stiff hairs. The inflorescence is compact and corymbose, consisting of groups of eleven or twelve flowers on short pedicels in the axils of opposite ovate-lanceolate, acute, sessile bracts, succeeding each other closely at the summit of the stem. The pubescence, which also clothes the green calyces, has a pleasing effect from the long silky hairs of which it is composed being scarlet in half their length, and white in the rest. The long tubular scarlet corolla is somewhat ventricose, two-lipped, the upper lip considerably exceeding the somewhat reflexed lower lip; of a soft and velvet-like texture, marked with purple in the throat; anthers coherent into a disc; the style exserted.

History.—This plant is a hybrid, the origin of which is involved in some obscurity. It is in the possession of Mr. Henderson, of Wellington Road, who has favoured us with the following information respecting it:—"An unknown Gesnera, of dwarf habit and light scarlet flowers, received from Mr. Low, was crossed with G. Cooperii, whence were produced hybrids which were called G. macrantha; one of these was again crossed with another variety (name not recorded), and the produce, exhibiting the purple marking in the throat, were called G. macrantha-purpurea." G. bulbosa, to which G. Cooperii is now referred as a variety, is an exceedingly variable species; and possibly all the forms which have contributed to produce the present plant were varieties of it, in which case it would not be a true hybrid, but a crossed variety; and the name should run G. bulbosa, var. macrantha-purpurea.—A. H.

Culture.—All the plants belonging to Gesneraceæ are of easy cultivation. Our present subject belongs to the tuberous section of the genus, and may be propagated either by division of the tubers, by cuttings, or by seeds. The time to divide the tubers is when they have made shoots an inch long, the cut part being dressed with fresh lime. Cuttings afford a better mode, and require to be rooted in sand under a bell glass.

When you have strong plants, start them in January in a gentle heat, gradually increasing the supply of water as the branches progress, and potting the plants when the shoots are about two inches long. The best compost is turfy loam, peat, and leaf mould, in about equal proportions, to which some charred cow-dung in flaky pieces, and plenty of silver sand, must be added. After potting, place the plants either in a dung pit or frame with a nice bottom heat, or in a warm corner of the plant stove. As they progress in growth inure them to full exposure, so that when in bloom they may be removed to the Conservatory or greenhouse. When the plants have done flowering, begin gradually to decrease the supply of water, to bring them to a state of rest; and when the foliage has died off, keep the tubers quite dry until it is time to start into fresh growth. By starting a few plants every month, flowers may be had throughout the summer, and by cultivating a collection, through the winter also.—A.

Vegetable Physiology.

By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

THE ELEMENTARY STRUCTURE OF PLANTS.

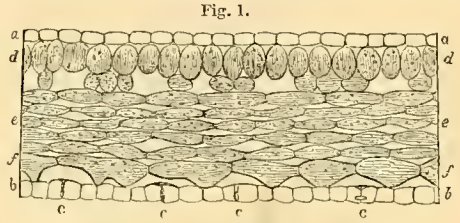
LEAVING now the general physical laws which influence the processes of vegetable life, we will pass to the examination of the structures of which plants are composed. It is necessary that we should enter a little here into the minute microscopic anatomy of plants, because the various portions of their construction are formed out of such a few simple elementary forms, and upon such a general plan, that the office which any organ or distinct part of a vegetable fulfils, depends much more upon the condition of its elementary structure than upon its form, or the position in which it is placed. For example, the stem, in its natural condition, produces wood in layers giving thickness to it; but when parts of the stem are separated from the main trunk by which they are connected with the roots, they will usually, under favourable circumstances, produce new roots from these same parts which otherwise develope woody layers; again, in the generality of plants, the leaves are rightly regarded as the chief organs of the respiration, but in such plants as the Cactus, where the leaves are represented by mere dry spines, the surface of the stem takes upon itself the office of the leaves. This capability of adaptation depends on the simplicity of the organization, or the fact that every part of the plant is built up of collections of one and the same kind of elementary structure, variously modified in their fully formed condition, according to the purpose to which they are destined.

This word *organ*, perhaps, requires a little explanation, especially as it is applied to two classes of structure. In the first place, it is applied to the parts of plants, which, by their completeness of form and independence of habit, show themselves to be, to a certain extent, separate individual members of a collective whole; thus the stem is one organ, the leaves are all separate organs, and so on. Again, when these are examined microscopically, they are found to be built up of separate and complete parts having a definite form and constitution; thus the spongy, succulent parts of all vegetable textures are built up of *cells*, that is, of little membranous vesicles or bladders, each one forming by itself a closed bag, enclosing its own peculiar proportion and kind of contents; these little sacs are what we mean by elementary organs, the simplest form of the living structure, in the furthest state of division to which it can be carried without destroying its character as part of a living object. It is on this peculiarity of the constitution of the textures of living creatures, that the contrast is founded between the *organic* and the *inorganic*, or mineral creation, since in the latter all parts of the mass of substances are composed of material in a condition devoid of especial form, and capable of being divided as far as our instruments will allow us to carry the operation, and yet each particle will retain all the characteristics (except the magnitude) of the entire mass; in organic structures, on the contrary, forming vegetable and animal bodies, if we divide the elementary organs into parts we at once destroy their peculiar vital characters, and render them indistinguishable by any other means than that applied to mineral substances, namely, chemical analysis.

All vegetable structures consist, in their earliest condition, of collections of membranous cells, assembled together in various ways and of various forms; and it is only in a later stage of growth that these undergo changes which fit them to form part of the firm and solid portions, such as the woody substance of the stems and roots, therefore we will examine this simplest condition of the vegetable tissues first.

If we make a very thin slice of such a soft, spongy part of a plant as the young pith, for instance, of the elder, and examine this by the microscope, we find it to be made up of vast numbers of little globular cells, formed of very delicate membrane; and as these, from their shape, can only touch one another at certain points, lying in contact like a number of cannon balls piled together, they afford us a good opportunity of seeing the independent, complete condition of these little elementary organs. In the young stages of the pith they are filled with liquid and solid matters, consisting of the substances which have been received into the plant to nourish it, and which undergo in such cells the chemical changes that give rise to the various properties of the sap. These *contents* of the cells must be left out of view for the present, until the various forms of the tissue have been described. In a thin slice of a leaf, in like manner, we find that the spongy substance, com-

Fig. 1.

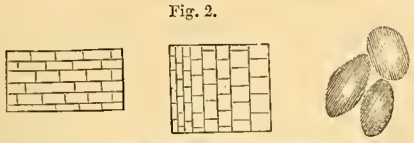


Vertical slice of a leaf magnified, to show the cells composing it.

posing the chief part of the thickness, is formed of cells either round, oval, or of irregular shapes, (Fig. 1, *d*, *e*, *f*,) only touching at certain points, and thus leaving *intercellular passages* between them. Such is the condition of cellular tissue in all the more soft and succulent parts of plants.

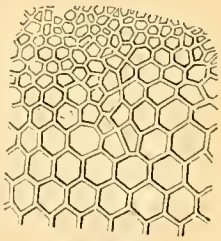
In other regions where somewhat greater strength is necessary, we find the cells of other forms, either square or oblong, so that they can be built up together like the stones or bricks of a wall, without leaving interspaces; or, as is often the case, of a twelve-sided figure, like the cells of a honeycomb, which also admits of their being packed together without interspaces, and is the form which globular bodies assume when squeezed together in a confined space. The square or oblong form is very common in the firmer cellular textures, such as cork and other structures forming the rind or bark, and intended to protect more delicate textures beneath them (Fig. 2). The twelve-sided form is more frequently met with in internal parts which have enlarged by the growth or swelling of the cells after they have become enclosed by firmer structures, the change from the globular to the angular form resulting from the mutual pressure (Fig. 3).

Fig. 2.



Magnified portions of cellular tissue.

Fig. 3.



Slice of hexagonal cellular tissue magnified.

A third form of the cell is produced when the young cell grows in such a manner that it becomes elongated into a long tube closed at both ends, and where this growth takes place so that the tubes taper to a point at each end, they become interlaced with each other, and form a very much tougher texture than where the cells come in contact by flat sides and ends (see Fig. 4, where the cells are magnified). This form is met with in almost all woody structures, and in all their fibrous or stringy textures, as in the *bass* or *liber* of the bark, in the ribs of the leaves, &c.

Fig. 4.

The foregoing forms are all composed of delicate membrane in the first instance, and the cells of globular or irregular form do not usually alter much subsequently; but the square and oblong forms, which serve for the construction of the firmer cellular textures, and the elongated tapering cells of the woody tissues, begin very early to receive new layers all over their internal surface to thicken and strengthen them. These layers of thickening may be compared with coats of paint applied in the inside of any hollow body; they are deposited from the fluids contained inside the cells, and in proportion as they are successively produced, the *walls* of the cells, as they are called, grow thicker, while the cavity is gradually encroached upon and diminished. This deposition of new layers goes on to such an extent in some cases, that the cavity becomes almost filled up, and we see this very remarkably in sections of the heart-wood of the more solid kinds of trees, but especially in the solid woody substance of the stones or shells of many fruits (Fig. 5, *a*, *b*,). But it is evident that as the walls are thickened they become less readily permeable by the fluids bringing new materials for the growth; accordingly we find a beautiful provision to obviate this difficulty. When the first layer of thickening is applied to the original membrane, a number of little points are left uncovered, and the successive layers as they are deposited one upon the other, always leave these points clear; thus when the walls have acquired even very great thickness, passages exist leading out at these uncovered points to the original membrane, so that fluids can readily penetrate into the interior, and filter through from one cell to another.

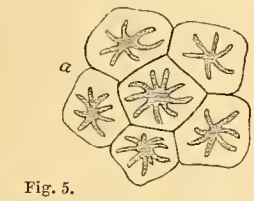
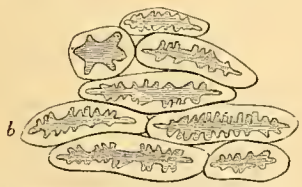


Fig. 5.



Magnified slices from the stones of the Plum and Pear, showing the greatly thickened walls of the cells; the shaded portions are the cavities.

This is the condition of the elementary organs in most of the firm and solid parts of plants; but there are many circumstances in which a greater lightness or more elasticity is requisite, in those structures which are to give the necessary strength. This is effected by a peculiar mode of development of the thickening substance applied upon the internal surface of the cells. Instead of extending all over the surface, it may be deposited upon certain lines extending round the walls, and the most frequent form is that of a spiral line running round and round the wall from one end of the cell to the other. The thickening matter laid down upon this line then presents itself as a spiral ridge project-

ing into the interior, and if it were separated from the membrane on which it is formed, it would be a spiral thread or fibre coiled like a bell-spring, or, if the turns were further apart, like a corkscrew. This mode of strengthening the interior evidently combines lightness and strength, and, when the fibre is a complete spiral, gives great elasticity; in fact, a long cell with a spiral fibre of this kind, is exactly represented by a piece of the old-fashioned kind of elastic tubing, made before caoutchouc was employed, consisting of a spiral coil of wire covered with leather or some similar substance. We meet with cells strengthened by spiral bands, by rings also, as if the turns of the spiral had been broken up and separated, and in older cells we often see the turns of the spiral, or the rings, connected by new cross pieces running lengthways, so as to give the cell the appearance of having a kind of network in the interior. Elongated membranous cells, with a delicate spiral thread, occur most abundantly as strengthening parts of delicate flexible organs; thus they are abundant in the ribs or veins of leaves, and in the leaf-stalks; they form, almost entirely, the veins of the coloured petals, and the ribs strengthening the other parts of the flowers, and in almost all stems we find a layer of them inclosing the pith, having been the first layer of strengthening texture formed in the region of the wood, while the summit of the stem was young and tender. These spiral-fibrous cells are commonly called *spiral vessels*, as they were formerly supposed to be air-vessels, from their resemblance in structure to the air-tubes of insects; but they are, in reality, only a form of the cellular tissue — the most delicate and elastic kind of strengthening structure, and have nothing to do with the respiration or nutrition (Figs. 6, 7).

Fig. 7.

Fig. 6.

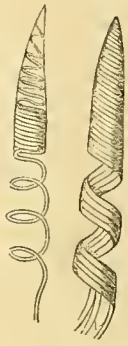


Fig. 6.—The upper ends of two spiral fibrous cells, (or *spiral vessels*,) with the fibres partly unrolled.

Fig. 7.—Portions of annular fibrous cells.

The spiral layer is sometimes very much thicker than in the situations just mentioned. The wood of the Cactus tribe is chiefly composed of cells in which the thickening layers are deposited spirally, and to such an extent, that the spire becomes a riband, instead of a fibre, applied edgeways to the cell-wall, so as to resemble a spiral well staircase in the inside of a column or tower.

The ringed cells, and those exhibiting the reticulations, sometimes occur singly, like the elongated spiral-fibrous cells known as spiral vessels; and all these kinds may be readily examined in the "strings" of rhubarb, which are the veins, or ribs, of the leaf-stalk, and can be very easily detached for microscopic examination in pieces of rhubarb which have been softened by cooking. Sometimes more than one spiral thread is formed in one cell; they then all run in the same direction, side by side.

These are the most important anatomical characters of the simple cells, and are retained when the cells enter into the composition of the more complex arrangements, which we shall next arrive at.

NOTES ON DECORATIVE GARDENING.—Fountains.

By H. NOEL HUMPHREYS, Esq.

THE most highly wrought effects produced in garden architecture have been those effected by means of fountains; of this, the well-known gardenesque water-works of Versailles and St. Cloud are sufficient evidence.

Sir Uvedale Price says:—"With respect to fountains and statues, as they are among the most refined of all garden ornaments, so are they the most liable to be introduced with impropriety. The effect, however, (especially that of water mixed with sculpture,) is of the most brilliant kind." Some have asserted, that fountains are unnatural; but natural *jets d'eau*, though rare, do exist, and are among the most surprising exhibitions of nature, which, in Iceland, and other volcanic regions, have struck the traveller with wonder.

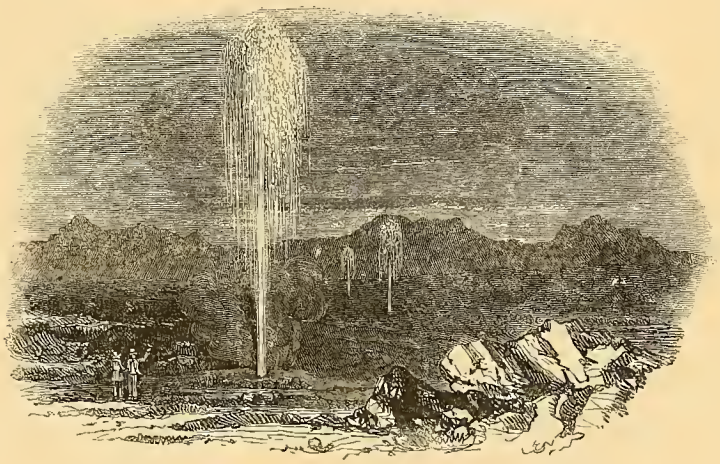
But though we find natural fountains in the wildest scenes of nature, it is not, however, necessary, in making artistic use of a natural law that produces a *jet d'eau*, to surround the artificial jet with the circumstances that surround it in nature, any more than it is necessary that the architect, in building with stone, should imitate in his work the rude form of the quarry from which it was taken. On the contrary, as fountains produce the best effect near buildings, and in combination with statuary,

architects and sculptors, like Bernini, says Sir U. Price, would not think of inquiring what were the precise forms of natural water-spouts; but knowing that water forced into the air must necessarily assume a great variety of beautiful effects, which, added to its native clearness and brilliancy, would admirably accord with the forms and colours of statues and architecture, would use it accordingly.

Nature and art are more closely allied than appears at a first glance; for all art is founded upon the development of some natural law, which Shakespeare perceived when he makes Polixenes, in the "Winter's Tale," say,

> "This is an art
> Which does mend nature—change it rather; but
> *The art is nature's self.*"

Under ordinary circumstances, the scenic features that surround garden fountains are such that the impression one receives on seeing water forced into the air is, that art has been employed to produce the effect. Therefore, while still water finds its more appropriate locality in the lower portion of the grounds, fountains may be more properly placed in the higher levels of a garden, as their evidently artificial character seems to find its appropriate situation in a position where water would be highly desirable and ornamental, but where it could only be brought by scientific and artistic means. Here, then, the display of art, even to a degree of ostentation, becomes legitimate; and fountains, of elaborate character and complicated architectural design, find their most imposing station at the extremities, or centres, of elevated terraces, and places of similar character, where the gardenesque, and semi-architectural character of the surrounding scene, is all in artistic harmony with them.

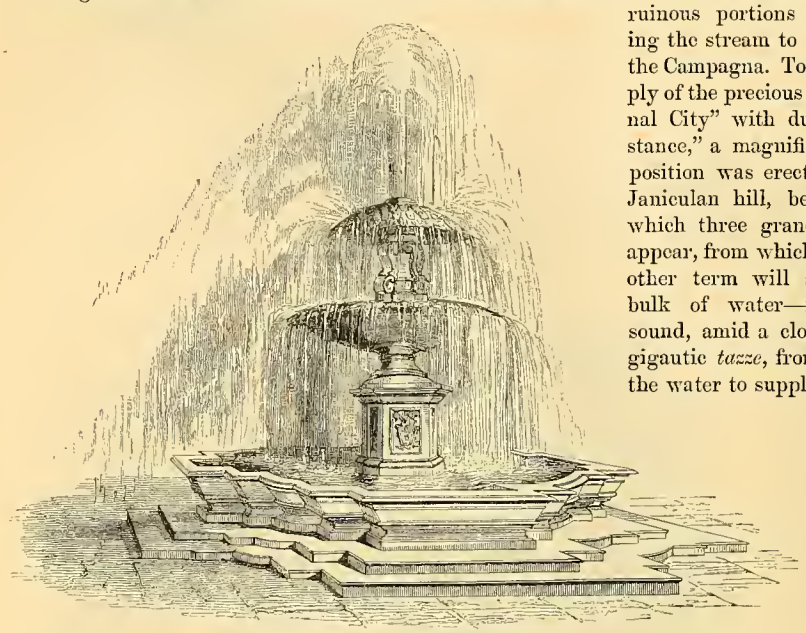


No. 1.—NATURAL JET D'EAU.

Very few good fountains have been as yet constructed in England; the two in Trafalgar Square—which our national *Charivari* (*Punch*) very aptly and cleverly compared to "*two saucers surmounted by a bottle of ginger beer*"—being signal failures; and the one recently erected at Brighton, though on a more ambitious scale, almost equally unsuccessful. Into the region of "*art*," in the treatment of fountains, we have not yet penetrated; but in simpler forms of fountains—that of a simple jet issuing at once from the level of the main water—greater success has been attained, as mere "dimension" is the great quality in this unadorned natural effect. The scale is, in fact, everything; and so far, the jet at Chatsworth is highly successful—indeed, magnificent; but all the other attempts at fountain-work, all the minor squirtings, including the too celebrated "water-tree," are beneath notice; and still more worthless, in point of art, are all the fantastic failures called fountains at Alton Towers.

Modern Italy is the classic land of fountains. Long before Le Notre and his cotemporaries and *collaborateurs* constructed the celebrated water-works of Versailles, the magnificent fountains of the Villa d'Este, and those of the Villa Aldobrandini, were well known and justly celebrated works, especially the building called the "Saloon of the Winds," where water is made to produce rushing sounds characteristic of the four winds, the personifying deities of which form sculptural groups, among which the play of waters has a very grand effect. Still more elaborate is the work of Giacomo della Porta, the celebrated *Mount Parnassus*, with the deities playing on different musical instruments, the sounds of which are imitated by the water in a manner, which, if not entirely successful, is yet sufficiently approaching the desired effect to be very astonishing. These wonders of the villas of the Sabine hills, in the region of Tivoli and Frascati, are, however, among the over-wrought effects of hydraulic science and art. More simple, and more artistically grand, are some of the fountains of Rome; that, for instance, which introduces the *acqua Paola* to Rome—a supply named after Pope

Paul V., the founder of the Borghesi family, who repaired one of the ancient aqueducts, and so united a magnificent stream of water once more to Rome, after centuries of severation, in consequence of ruinous portions of the aqueduct allowing the stream to waste itself uselessly on the Campagna. To usher this restored supply of the precious element into the "Eternal City" with due "pomp and circumstance," a magnificent architectural composition was erected on the slope of the Janiculan hill, between the columns of which three grandly designed apertures appear, from which three torrents—for no other term will sufficiently express the bulk of water—fall with a deafening sound, amid a cloud of spray, into three gigantic *tazze*, from which conduits carry the water to supply many of the greater, and an endless number of the lesser fountains of Rome.

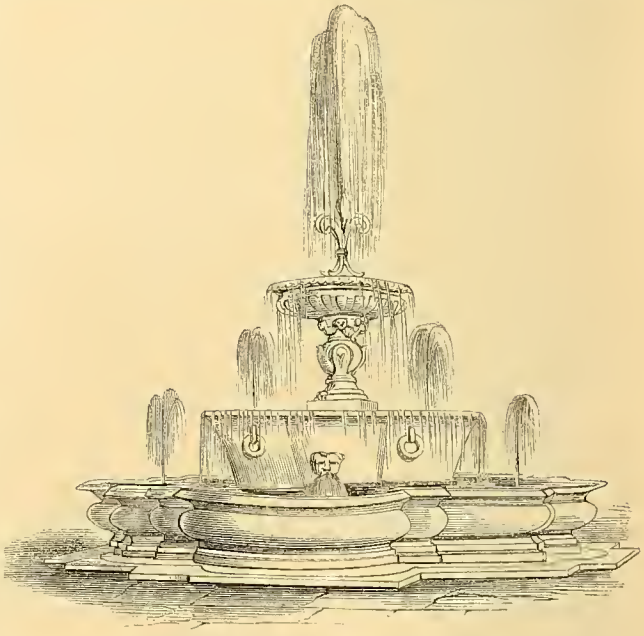


No. 2.—THE FOUNTAIN OF ST. PETER'S.

The fountains on the *Piazza San' Pietro* are, perhaps, the finest detached specimens of purely decorative fountains in existence. They are the work of Carlo Maderno; and such is the magnificent character of this simple design—the quantity of water thrown up, and falling in clouds of spray, in which, at a certain hour, one or more rainbows are distinctly seen—that, even immediately in front of St. Peter's, one of the largest and most imposing buildings in the world, their effect, so far from being insignificant, is most grand and imposing. These, with the great fountain of Trevi, have afforded Madame de Stael subject for some of her most eloquent, descriptive passages in her admirable novel, "*Corinne, ou l'Italie.*"

No. 2 is a small, and, of course, inadequate, representation of one of the fountains of St. Peter's; No. 3, that of the Palazzo Fornesi; and No. 4, another grand and simple example of the fountains of Rome—that of the Court of the Belvidere.

In these fountains the abundance of water always forms the grandest feature—a mere squirt is but a caricature in comparison; for, to cite a passage recently quoted by Emerson in his *Representative Men*, "A single drop of sea-water possesses all the chemical properties of the great ocean of which it is a part, but it is incapable of representing the phenomenon of a storm."

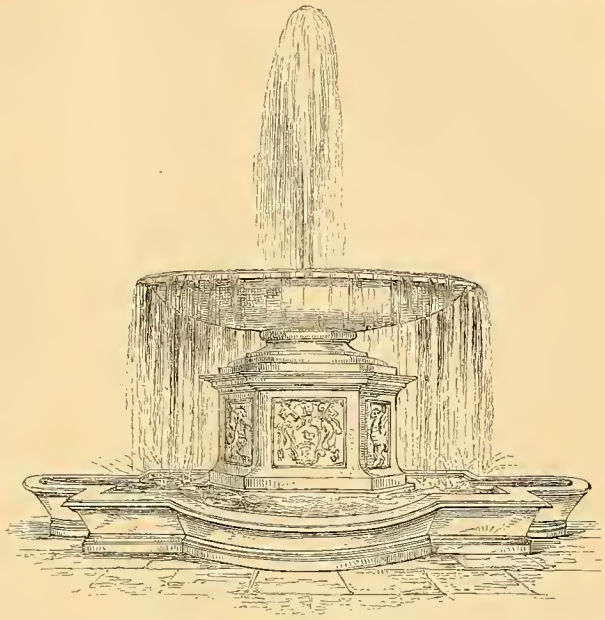


No. 3.—FOUNTAIN OF THE PALAZZO FORNESI.

Thus we see that *magnitude* must inevitably form a great element in the sublime, and that dimen-

sion, as well as design, are points to be considered in the construction of objects intended to produce a certain effect of grandeur.

In places, however, where an enormous supply of water would be impossible, very pretty effects, approaching even the grand, may be attained by judicious management. The water, by the assistance of special contrivances, being made to appear more plentiful than it is, and by the aid of moveable heads fitting on the pipe of supply, a great variety of effects may be produced; but these should only be used on certain occasions, the simplest possible form being the one in which the action of the fountain should be commonly seen.



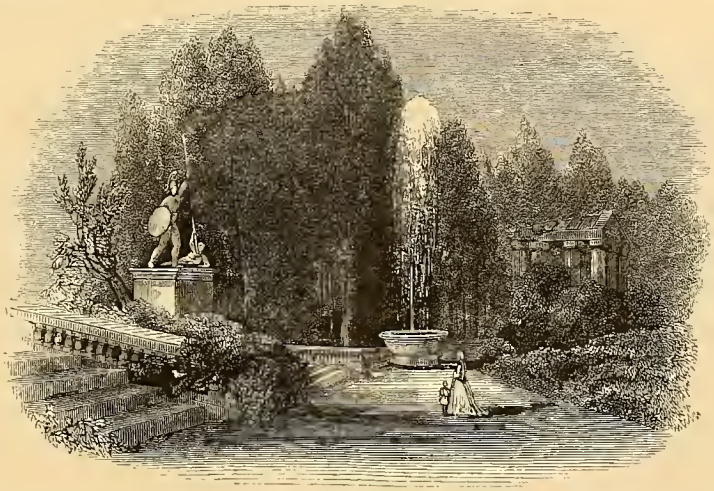
No. 4.—FOUNTAIN OF THE VATICAN, IN THE COURT OF THE BELVIDERE.

My examples from the fountains of Rome have not been selected to exhibit the vast scale and magnificence of the greatest of those works, many of which occupy great space; being, in fact, complicated sculptural tableux, in which a great number of statues are required to complete the composition. I have rather selected such examples as might be applicable to practical purposes.

The engraving beneath is not intended to show the design of a fountain which can be entirely recommended, but to exhibit the beautiful effect of a lofty jet of sparkling water against a background of dark foliage.

> "—— dans l'air s'enflammant au feux d'un soleil pur,
> Pleuvoir en gouttes d'or, d'emeraude, et d'azur."—DELILLE, "*Les Jardins.*"

Having attempted to explain the general principles of art on which the introduction of fountains should be studied, I shall, in my next paper, give a few simple and practical designs, upon a less ambitious scale than those herein introduced, which were here necessary for the exemplification of the branch of the subject treated of.



Miscellaneous Notices.

Influence of Fungi on healthy vegetation.—"The influence of fungi on perfectly healthy tissues, is now an established fact, The case of bunt, is a well known example, the spores of which, constantly reproduce the disease; and, if instances are not sufficiently satisfactory in the vegetable kingdom, we have only to turn to the facts recorded respecting the origin of the disease of silk-worms, called Muscardine, from the spores of a species of Botrytis, to show that fungi do not grow exclusively on languishing or decaying organisms. Prejudice to the contrary is so very strong and general, and is still in ignorance of facts bearing on the subject, so often put forward, that the real state of the case requires to be frequently pointed out, especially since incorrect preconceptions on this subject may be of very evil consequence in minute research as to the origin of the disease, both in the animal and vegetable kingdom."—(*Berkeley.*) It has long been well known that certain species of fungi traverse the loose tissues of the green portions of plants; and, in many cases, the more solid structures, by means of their creeping mycelium, or spawn, decomposing the substance of the cells, and reducing them eventually to a decaying mass. The mode in which this change and decomposition is brought about, was however unknown, until, after repeated experiments, Mr. F. J. Graham succeeded in eliciting the fact that the change is due to the contact of the mycelium, which, after having performed its office of sending up fruiting shoots, rapidly decays. Doubtless, in the first instance, the vital energies become greatly damaged by, the presence of the parasitic rootlets, but the main act of decomposition is due to the "body of death" which cleaves to them. No more fatal, or more general cause of disease, perhaps, exists in the vegetable kingdom, than the contamination of decaying tissues, and if there be not an extremely vigorous constitution, to throw off the gangrened part, the decay, once began, is sure to spread.—M.

REVIEW.

The Bee-Keeper's Manual; or, Practical Hints on the Management and Complete Preservation of the Honey-Bee. By Henry Taylor. London: Groombridge and Son. 1850.

This is an enlarged, and profusely illustrated, edition of Mr. Taylor's very useful manual, containing very complete directions for the management of our interesting and busy friends, and such practical illustrations of the various structures necessary for their preservation as will enable the most uninitiated, to undertake the management of this useful, and when properly managed, profitable aid to the poor man's income. The work is very neatly, but plainly got up, and the directions are evidently the result of practical investigation. In the preface we find the following passage:—"The author must be considered as merely laying down a scheme of general recommendations, aiming much less at novelty than at plain practical utility; not hesitating occasionally to borrow the language of other unexceptionable authorities, where it clearly expressed his convictions, or coincided with the results of his own experience, but carefully abstaining from any interference with the dogmatists and hypercritics in the settlement of the affairs of their peculiar vocation." We can confidently recommend the work.—A.

NEW AND RARE PLANTS.

Cereus Tweediei, *Hooker.* Tweedie's Golden-flowered Torch-thistle.—Nat. Ord., Cactaceæ, § Cereidæ.—A very handsome greenhouse succulent, with narrowly-cylindrical stems—one inch in diameter—tapering upwards; they are glaucous green, with about sixteen straight furrows, alternating with obtuse, even (not mammillate) ridges; the spines are in crowded clusters, numerous, four or five of each group being stouter and longer than the rest. The flowers are rich orange colour, numerous, on plants less than two feet high; they are three inches long, curved upwards at their base, and outwards at top, the petals small yellow, the anthers purple.—From Buenos Ayres; introduced before 1848. Flowers in September. Messrs. Lee, of Hammersmith.

Tropæolum Wagnerianum, *Karsten.* Wagner's Indian Cress.—Nat. Ord., Tropæolaceæ, § Tropæoleæ.—A distinct and probably pretty species, requiring a cool stove temperature; it is without tuberous roots, and has smooth, slender, climbing stems, and peltate, oblong-triangular leaves, deep green, and shining above, paler beneath. The flowers grow from the axils of the leaves along the upper part of the branches, on long, slender, twisted peduncles; the calyx, which is green, has a long tubular spur, orange-coloured, tipped with green; the petals are wedge-shaped, deeply toothed, and of a dark violet colour.—From Venezuela: damp woods on the mountains of Trujillo; introduced to Berlin in 1849. Said to flower throughout the year; and though requiring warmth in winter, will probably succeed out of doors in summer; it should have a poor soil and hot situation, if planted out.

Heintzia tigrina, *Karsten.* Spotted Heintzia. (*Karsten's Auswahl Gewachse Venezuelas*, t. 11)—Gesneraceæ § Gesnereæ.—A robust growing, and showy stove sub-shrub, with stout soft stems reaching three or four feet in height, and bearing opposite lanceolate serrated leaves, a foot in length, of a deep green colour with a bluish tinge. The flowers are in axillary cymes, with rosy coloured bracts; the calyx large five-parted, rose coloured; the corollas white, about an inch in length, funnel-shaped, curved, the limb divided into five spreading segments, studded on the face with soft hairs which produce a silky gloss, and freely marked with purple spots and freckles. Rather coarse looking, the flowers too much overpowered by the leaves.—From Venezuala; elevation 5000 feet in moist shady places; introduced in 1849. Flowers in summer. Messrs. Henderson, St. John's Wood.

Primula Auricula, nigra-plena

J. Rosenberg del. & lith.

Printed by C. H. Jeffers London

PRIMULA AURICULA Var. NIGRA PLENA.

Nat. Order, Primulaceæ.

Generic Character.—Primula, *Linn.* *Calyx* sub-campanulate or tubular, very often angular or inflated, more or less deeply five-toothed. *Corolla* hypogynous, funnel-shaped or salver-shaped; tube cylindrical, short or elongated, dilated in the throat, naked or furnished with scales; limb five-toothed, patent or erect, lobes obtuse, emarginate or bifid. *Stamens* five, inserted on the tube of the corolla, opposite its lobes, included; *filaments* very short, *anthers* oblong, bilocular, dehiscing longitudinally. *Ovary* one-celled, with a central basilar, somewhat stalked, globose placenta; *ovules* numerous, peltately amphitropous; *style* filiform; *stigma* capitate. *Capsule* one-celled, five-valved, valves entire or bifid. *Seeds* numerous, on the free central basilar placenta, dotted-rugose, flat on the back, convex and umbilicate on the face. *Embryo* straight in the axis of fleshy albumen, parallel to the umbilicus.—(*Endlicher, Gen. Plant.* 4199.)

Primula auricula, *Linn.*—Leaves obovate, dentate-serrate, or almost entire at the border, mealy or densely ciliate with short glanduliferous hairs; scape glabrous, or with the pedicels and calyces mealy above; involucre much shorter than the pedicels, its leaflets ovate and obtuse, the throat of the corolla densely mealy; stamens of the short-styled forms inserted on the throat, the capsule slightly exceeding the calyx.

Var. *nigra plena*. Double Black Auricula.

DESCRIPTION.—Perennial herb, with a subterranean rhizome, producing the flower-stalks in the axils of the leaves. Leaves smooth, rather fleshy, not rugose, mealy, obovate, slightly toothed. Flowers numerous, in an umbel on the end of an axillary peduncle, derived from the underground stem; the umbel, with an involucre of ovate leaflets, shorter than the unequal pedicels. Calyx oblong, round; throat of the corolla devoid of scales; lobes of the corolla slightly obcordate, deep purple; stamens and ovary metamorphosed into petals resembling the lobes of the corolla.

History, &c.—The Auricula, which has been an inhabitant of our gardens for more than two centuries and a half, and has attracted a large share of the attention of florists, is a native of Switzerland, and it is also met with in parts of Bavaria and Swabia. It grows on rocks of the Alpine and sub-Alpine regions, also in the plains contiguous, flowering in spring on declivities, among the melting snow of the Alps. The flowers vary much in colour in gardens, but Professor Koch states, that he never met with a wild purple specimen.—A. H.

This very pretty variety of the Auricula was observed blooming at the nursery of Messrs. Rollisson of Tooting early in the past spring. Of its origin we have no information; but we learn from Messrs. Rollisson, that they received it from one of the Ghent nurseries, in 1849, which, as far as we are aware, was the date of its first introduction to English gardens. It blooms freely in the spring, and proves a charming addition to our frame perennials. Our drawing was taken from Messrs. Rollisson's plant, above referred to.

Culture.—This singular but beautiful plant, though a freak of nature, and showing the effects of high cultivation, is not less interesting on that account. It shows what high cultivation must result in. Last year we had a perfectly double Cineraria; this season we had several with numerous rows of petals; so that we have no doubt that, like Burns's "wee crimson-tippit flower," the Cineraria will ultimately become a double flower. These things are interesting, as exemplifying the adaptability of vegetable forms, and showing that the careful cultivator must ultimately be rewarded.

This elegant little plant, like its progenitors of the Alpine crag, delights in a light rich vegetable soil, such as decayed leaves and sandy turfy soil liberally intermixed with gritty sand, or the debris of rocks. In potting take care to drain the pot thoroughly; and, if you have to prepare the soil, take equal parts of leaf mould and sandy loam, to which sufficient gritty sand must be added to make the whole free and open. After the plants are thoroughly established they may, in the second shift, have a little perfectly decayed cow-dung added to the soil, but use it with caution, and not until it is perfectly decayed, and at the least two years old. This Auricula will be best kept in a frame through the winter, and it must be kept comparatively dry. After it has done blooming let it remain fully exposed until the growth is matured and the lower leaves begin to turn brown, then it may be removed to a north aspect, and there remain, until the rains of autumn render it necessary, that it be removed to a more sheltered situation. Planted out upon rockwork, or in a sheltered and rather dry border, this will become an exceedingly interesting plant, and will rank very worthily with the double Polyanthus and Primrose, and add another to our collection of gay spring flowers.

The Auricula is propagated by division of the plants, and by cuttings. The proper time to

divide them is in July, keeping the plants in a frame until they have made fresh roots, and are established in the new soil, when they may be fully exposed. Cuttings must be taken off after the plants have completed their growth; place them round the sides of a pot in sandy soil, and place the pot under a hand-glass until the roots have protruded. If the shoots are full of sap dry them for a few hours before the cuttings are put in, but under ordinary circumstances, no such precaution will be necessary. As all double flowers are more delicate than single ones, considerable care is necessary, more especially in the winter season, in their management. Guard against wet, and then you need not fear the frost so long as you keep the plants in a dormant state, but after the flower stems begin to manifest themselves, the frames should be carefully covered every cold night.—A.

REMARKS ON LATE FLOWERING AND EARLY FORCING PELARGONIUMS.

By Mr. H. ROSIER, Brooklands Nursery, Blackheath.

THE present being an appropriate season for the propagation of this useful class of Geraniums, a few remarks on their management may not be out of place. I have found that cuttings, struck at this season of the year, from plants which have been forced, and the wood partially ripened, produce fine vigorous plants for autumn flowering and early spring forcing, imparting a gay and lively appearance to the Conservatory and Greenhouse through the autumn and winter months, when we have so few other flowering plants. Prepare the cutting pots in the usual manner, and drain with potsherds, or other loose porous materials, about one-third of the depth; then fill up with compost prepared in the following manner, namely, equal parts of turfy loam, peat, and silver sand, well incorporated, and sifted through a moderate meshed sieve to take the largest of the lumps and stones out. Select strong shoots, which make into cuttings about three or four inches long; take off the lower leaf or two, if they are short jointed, so as to leave the base of the cuttings clear, otherwise they are liable to damp off, and place them round the edges of the pots, about an inch, or an inch and a-half deep. When planted water them freely, so as to settle the soil firmly in the pots; place them in a cool, close frame, or pit, and sprinkle them over-head occasionally, which will prevent their shrivelling, and accelerate the rooting process. When rooted, give air gradually to harden them, preparatory to potting off, which must be done as soon as possible. After they are sufficiently hardened, pot in large or small three-inch pots, as they may require, using a good rich compost.

For autumn flowering, I have found the following the most desirable, being free blooming kinds, and strong growers:—Forget-me-not (Lyne), a fine high coloured flower, and one which will be found to give satisfaction to all who grow it; it will also force well in the spring. Meteor (Beck), a showy flower, and well adapted for late purposes. Negress, a dark flower, and very free; also adapted for spring forcing. Sultana, or Perpetual, of dwarf close habit, and free flowering. Gauntlet, a fine large bright flower; also well adapted for early spring forcing, as it will stand a very high temperature without going blind. Selina, a bright red, and beautiful variety; this is also well adapted for early spring forcing. Lady Mary Fox, a bright red; this, with a little warmth, will be found to flower all through the winter, and, as a bonquet flower, is most desirable; it will be found a beautiful bedding plant, if cultivated to that end, being a most profuse bloomer. Quercifolia superba, a bright scarlet flowered oak-leaved variety; this will force well, and is invaluable for bedding purposes. Duke of Cornwall, an established favourite, of fine high colour, and good trusser; this may be forced successfully with the second crop in spring. Mrs. Johnson (Dennis), a flesh colour, and most profuse bloomer; will be found to contrast well with the other colours. Laneii, a variety which should be grown by all who require winter flowers, as it will flower through the whole of the winter, and stand a high temperature in the spring. When the beauty of the plants is not so much an object as the flowers, they should not be cut down, or re-potted, when housed, which should be done early in the autumn. Top dress the pots, and pick out all dead flowers, decaying, and superfluous leaves. A few of the fancy varieties should also be selected. The following will be found distinct and free bloomers:—Anais, Jenny Lind, Fairy Queen, Queen Superb, Statiaski, and Sidonia. The following, for early forcing, will stand the most fire heat:—Admiral Napier, red; Alba multiflora, white; Surpass Admiral Napier, red; to be followed by General Washington, red; and Colleyanum, purple; with such others as I have enumerated above. Scarlets must not be neglected, and the following, I think, will be well adapted:—Gem (Ayres), this will stand a high temperature, and throw fine trusses; Queen, or Perpetual; Royal Dwarf; and Compactum.

Having now enumerated a few of the best kinds for late flowering and early forcing, I will add a few remarks on their after treatment. When they get well established in the small pots in which they were first potted, and are long enough, say six inches high, they should be stopped to cause them to throw out their lateral or side shoots, which they will do in a short time at that season of the year. When they have made their shoots, they should be repotted into pots a size larger—48's, in a good rich compost prepared in the following manner: equal parts of good turfy loam, peat, and well decomposed cow-dung, or, if that is not conveniently to be obtained, horse-dung, with a good portion of silver or river sand. The potting may be repeated in the autumn for spring flowering plants, but is not advisable for those which are wanted to flower in the autumn, as it will be found to throw them into robust growth, and defeat the object aimed at—flowers. The pots must be well drained with pot-sherds, or broken oyster shells, for on this much depends for a healty state of the roots. Thin out the leaves and small shoots occasionally, to throw the whole of the sap into the strong shoots which will produce the finest flowers. The fancy varieties being more delicate growers than the other kinds, and consequently not so strong rooted, will require more drainage. A little charred cow-dung, in a rough state, just over the potsherds, will be found most beneficial for these. The plants while standing out of doors in beds, should be removed now and then to prevent their rooting through the bottom of the pots, which will greatly check them when removed, if allowed to do so. When housed, keep the plants as near the glass as possible to prevent their drawing. Put in the first lot of plants in the forcing house in January, beginning with a moderate heat, and increasing it as the plants show their flower buds. A heap of soil should now be made for autumn use, in the following manner:—Take equal parts of good loam and hot stable manure, let the manure be well worked until it is properly heated, and then put a layer of each alternately. After it has lain about two months turn it, so as to incorporate the whole, adding a little rotten cow-dung as you proceed. This, with a little leaf-mould and silver sand, will be found to answer every purpose for Geraniums and strong growing soft-wooded plants generally.

CULTURE OF THE GENUS CHOROZEMA.

By PAUL PROGRESS, Esq.

OF all beautiful New Holland plants, the plants belonging to this interesting family are the most beautiful; for, blooming almost throughout the year, and more especially through the winter and early spring months, they contribute to the decorative appearance of the conservatory, or yield a few flowers for the bouquet at a time when they are especially acceptable and valuable. They are also plants of tolerably easy cultivation; at least, those who have learned the rudimentary principles of cultivation, will find little difficulty in managing some of the more showy examples of the family. Others, as C. Henchmanni, and angustifolia, are more difficult to manage, but, before we conclude this article, we will endeavour to make their cultivation clear and easy to all.

The Chorozemas are propagated by cuttings of the half ripened, young wood, taken off in July or August, making choice of the short, stiff, and weak, or medium growth, but avoiding twigs of a robust habit. These, after being trimmed, should be about one inch long, and must be inserted in sand, under the protection of a bell-glass. In preparing the pot for the cuttings, take care to drain it thoroughly, by filling it half full with potsherds, then place fibrous peat about an inch deep over the drainage, fill up with clean silver sand, and the pot is ready for the cuttings. It is indispensable that a little peat be placed under the sand, as it affords nourishment to the young plants, until they are potted off, and admits of their being allowed to remain longer in the cutting pot, than would be advisable, if they were growing in sand only. After the cuttings are all in, place the pot in a close cold frame, water when necessary, and wipe the condensed moisture from the inside of the glass, twice or thrice a week. Here the cuttings must remain until they are cicatrized, when they may be removed to a rather warmer situation, the pots be plunged in a very slight bottom heat, and, in a few weeks, they will be ready to pot off. If it is late in the season, say the end of October, before the cuttings are in a fit state to pot off, it will be the best plan to let them remain in the cutting pot through the winter, and to pot them off in February, but if they are fit for single pots in September, then they will be much benefited by being potted off early.

The plants, when sent out from the nurseries, are generally from twelve to eighteen months old, and, at that time, should be established in five-inch pots. Presuming you have selected dwarf, healthy, bushy, well rooted specimens, prepare the following compost: rich fibrous peat, two parts; leaf mould, one part; turfy rich loam, two parts; clean potsherds and charcoal, broken to the size of

horse beans, one part; with sufficient gritty sand to make the whole, when mixed together, light and porous. Time was, and that but a year or two back, when cultivators, to secure porosity, used the soil in rough pieces, and "a down westward" cultivator, to show the strength of his affection, has recommended pieces the size of a brick. Thus, though this served the purpose of growing the plants rapidly for a short time, they soon became unhealthy, for, the compost being deficient in silicious matter, from the impossibility of mixing the sand with the coarse pieces of turf, it soon became unhealthy, and hence the plants were brought to a premature end, much to the disappointment of the cultivator, whose labours were cut short just at the time when his anticipations were at the highest pitch. Now, those who understand the mixture of composts, pursue an opposite course, and, after selecting their soil, and divesting it of all superfluous and inert matter, they break it into small pieces, so that the whole will pass through the meshes of a half-inch seive; and secure porosity by the intimate admixture of sand, potsherds, charcoal or soft porous sandstone broken small. In this way the compost is of the same quality throughout; and hence the roots receive neither check nor change of food, but when large pieces are interspersed through the mass, the roots of the plants either avoid entering them altogether, or by entering them, are subject to constant changes. This is the rock upon which the advocates of "the accumulative," "the one shift," and "the large shift" potting system foundered; they got plants to grow rapidly for a time, but that time was limited, and at the end of it, death was the *finale*.

CHOROZEMA CORDATA: grown at Kew.

Let us not be misunderstood. In repudiating the rough compost, and the one shift, we do not disapprove of a large shift, but we would enter our protest at once and for ever against the use of rough compost. Look to nature, the primæval clod, do we find it like a honeycomb, loose and open like a basket for Orchids? No. But do we not on the contrary, while it is *sufficiently* permeable for the free ingress of air and water, find that it is firm and compact, and sufficiently solid to prevent the changes of every breeze that blows. In this way progress is comparatively slow, but certain; and the plants, instead of progressing with great rapidity for a time, produce strong, healthy, thoroughly matured wood, and dwarf compact growth, yielding abundance of bloom; and which abide with you for years. But to return to our young plants:—Having prepared your compost examine the roots of the plants, and if they are strong and healthy, prepare a pot two sizes larger, and after draining it properly proceed to pot your plants, placing some of the roughest part of the compost over the drainage, and proceeding to fill up firmly with the finer soil.

The best place for the plants after potting is a close frame or pit, taking care to ventilate freely, but to keep a moist atmosphere, and to shut the frame up for an hour or two every evening, but open it again either partly or wholly before retiring for the night. In this way the plants will make rapid progress, and therefore due attention must be paid to stopping the rude shoots so as to induce close compact and healthy growth. If the plants progress as they ought to do, they will probably require a second shift during the season, and indeed, if you wish to make the most of your time, the plants may be kept growing slowly until the winter fairly sets in, at which time they should be brought to a state of rest. In the second year some of the plants will produce a nice head of bloom; but, in order to secure rapid growth, remove the bloom buds when quite young, and keep the plants vigorously growing through the second season. For potting, no general rule or time can be specified; if a plant is in good health, and the pot full of roots, a shift any time between Christmas and October will not injure it, but never shift a plant until the pot is full of vigorous roots, and take special care that the roots do not become matted before you shift the plants.

Manure water in a weak state may be used with advantage to hard-wooded plants of all kinds,

but use it with caution, and not more than twice a week. That prepared from sheep's dung and soot is the best, but it *must* be used in a perfectly clear state.

CHOROZEMA TRIANGULARIS: grown at Brooklands Nursery.

Chorozemas are subject to the attacks of red spider, and also to thrips and mildew; the best remedy for the whole of these pests is sulphur and water, vigorously and plentifully supplied. Take a plant and lay it upon its side in the open air, then with a syringe wash it thoroughly, and after watering dust it with sulphur, and repeat the dressing until the pest is destroyed. C. Henchmanni and angustifolia are the most subject to mildew, but it may be destroyed by the timely application of sulphur and water.

The accompanying engravings represent C. triangularis, and a specimen of C. cordata grown in the Royal Botanic Garden at Kew, and are certainly the finest plants which have come under our notice during the season, not even excepting those at the exhibitions at Chiswick and the Regent's Park.

The following are some of the most distinct and beautiful of the species which are met with in cultivation:—

C. angustifolia.—A remarkably graceful shrub, with long, slender, somewhat scrambling stems, having linear acute leaves with recurved margins, and racemes of pretty flowers, of which the standard is orange-yellow and the wings crimson-purple. Flowers in March and April. New Holland. Introduced 1830. Formerly called *Dillwynia glycinifolia.*

C. cordata.—An elegant dwarf shrub, with many slender branches, clothed with sessile cordate obtuse, spiny-toothed leaves, and bearing the flowers in more or less drooping racemes. They are orange in the standard, with scarlet or crimson wings, sometimes scarlet with purple. Flowers in March and April. New Holland. Introduced in 1836. There are numerous varieties as regards the colour of the flowers. A fine variety of this species, with a more vigorous habit, and larger and deeper coloured flowers, is called *C. cordata Lawrenceana.*

C. Dicksoni.—A handsome, dwarf, bushy-growing shrub, furnished with narrow leaves, and bearing a profusion of beautiful dull scarlet and yellow flowers, something in the way of *C. Henchmanni.* Flowers from March to May. New Holland. Introduced in 1836.

C. flava.—A very pretty and distinct form for the cultivator, though regarded by some botanists as a variety of *cordata.* It is of erect, slender habit, with elongate ovate leaves sinuately toothed on the margin, the teeth spiny; the flowers are in racemes, the standard deep clear yellow, the wings much paler, or lemon-coloured. Flowers in March and April. New Holland. Introduced about 1848.

C. Henchmanni.—A hairy shrub, with short twiggy branches, covered with needle-shaped leaves, and bearing numerous axillary racemes of flowers, which are very ornamental, light scarlet, with a yellow mark at the base of the standard. Flowers from April to June, and sometimes onwards till September. New Holland. Introduced 1825.

C. ilicifolia.—A diffuse spreading shrub, with oblong lanceolate pinnatifidly spinous leaves, and bearing scarlet flowers, the standard marked with yellow at the base. Flowers from March to August. New Holland. Introduced 1803.

C. ovata.—A handsome shrub, with weak, ascending, winged stems, furnished with ovate-acute leaves, and bearing short racemes of showy flowers, usually scarlet, with the wings crimson. Flowers from March to May. New Holland. Introduced 1830.

C. spectabilis.—A very beautiful small shrub, with slender, twining or scrambling stems, the leaves of which are elliptic-lanceolate, obovate, or cuneate, and the flowers pale orange in the standard, tinged with crimson, the wings being crimson; they grow in long drooping racemes. Flowers from April to July. New Holland. Introduced 1839.

C. triangularis.—A beautiful, dwarf, spreading shrub, of branching habit, with sub-hastate leaves, pinnatifidly spinous on the margin, and the flowers in short racemes, the standard scarlet, the wings purple. Flowers in March and April. New Holland. Introduced 1830.

C. varia.—A dwarf, compact-growing species, with variable leaves; in some forms broadly ovate, toothed, and spiny on the margins, in others almost entire, and sometimes nearly round in outline. The flowers are very numerous, in short racemes, large and showy, usually orange, with crimson wings. Flowers from April to July. New Holland. Introduced in 1837. The variety called *C. varia nana,* of remarkably dwarf habit, is the best for a limited collection, though there are two or three other very distinct and beautiful forms.

THE PREPARATION OF THE PANSY FOR EXHIBITION.

By Mr. G. GLENNY, F.H.S.

IF the judges at floral shows did their duty, and threw out of competition all those flowers which had distinct and disqualifying blemishes, there would need little instruction for showing the Pansy; but either from bad taste, or want of taste, in the judges often appointed, there is no guide for exhibitors, and every decision tends to throw those cultivators who attend to rules, completely off their guard. It is the most extraordinary circumstance that men who subscribe to the properties which constitute a good Pansy, nevertheless, by their actions contradict them. We have watched the stands all through a season, and in no one instance have been able to count twelve flowers out of thirty-six that were set up according to the standard—not that we expect any to be equal to it, but we mean that in the case of two-thirds of the flowers, essential points have been sacrificed to the coarse taste or want of taste that places size first in estimation. We all know that there is a great abundance of coarse large flowers in which the best points are deficient, or in which there is some unquestionable blemish; of these we would speak, that exhibitors possessing taste and judgment may avoid them, and if the judges will not appreciate correctness, *they* must be condemned instead of the showers.

In the first place nothing detracts so much from the brilliance of the Pansy as a small field or ground-colour, and a large eye; yet judges will persist in giving prizes to such flowers in the very teeth of the fact that they are already too numerous, and always lower a stand. The law upon this subject is not an arbitrary one; and it is the very essence of the "*properties of flowers*," that the standards, although to a certain point stringent, are in no case calculated to limit varieties. A large field of white or yellow, or a small field, is a matter of variety with which the properties do not interfere; but if the rays of the eye touch the marginal colour it is fatal; the standard, therefore, makes no condition that the field shall be small or large, but it forbids the ill proportion of eye and field that makes one fill the other and touch the margin. Why, then, should any exhibitor fly in the face of this detraction, and put a third of his flowers, or any of the flowers in his stand with this decided blemish? Or, rather, why do not the judges at once discard them, and teach exhibitors that if they will not obey the rules they will have no prize? It needs only that an exhibitor should put half a dozen flowers, with good large fields of white and yellow together, and half a dozen of those indefinite things which have scarcely any ground colour, or field at all, and compare them; he will soon see that one is dull and monotonous, the other bright and cheerful. There is no one point to which exhibitors ought to pay more attention, if they wish for good effect in their stands; but flowers having these good qualities, will not, in all cases, be so large as the undefined coarse kinds which prevail among the exhibitors.

There is another point to which the attention of exhibitors should be directed. They should avoid all those which have serrated edges, and deep indentations in the under petal; these are faults which often go together, and ought to be fatal to a stand; but the same coarse notions, which overlook the eye touching the margin, and yield to size, will overlook notched edges, deep indentations, and sundry other blemishes, to encourage what they call fair growth. The cultivators for exhibition may tell us that there is no encouragement to show according to properties, but this has to be tried. Judges observing that all are careless alike, give to the finest growth; but they hardly dare, indeed they would hardly be disposed, to overlook smooth edges and brilliance in a collection of moderate sized flowers, to give the award to dulness and coarseness in a larger growth. There is only one way in which the judges could induce attention, and that is by excluding for once every stand that had flowers with these decided faults. The case is thus, we have seen it over and over again:—A number of stands are put up, which, if the judges were strict, ought to be all rejected; but the judges have not the moral courage to administer so sweeping a lesson; they fear offending all, and therefore, first of all deciding that all are disqualified alike, they lose sight of all blemishes, because some of the stands are free from them, and merely award the prizes to the finest growth. Let us advise amateur growers—for the nurserymen may do as they please—to put in their stands

No flower that has a serious indentation.

No flower of which a single ray from the eye touches the margin.

No flower with a notched or serrated edge, that is to say, none that are conspicuously so, for there are not many entirely free.

No flower that has not a distinct field of white or yellow, or is a self.

No self that has any cloudy or different colour as it approaches the centre. Nothing so mars a stand as a cloudy centre.

No flower which has two shades in the ground-colour, yellow, white, or straw, it must be all one shade.

No flower that is not a respectable approach to a circle.

No flower that is crumpled, and will not lay flat.

Attention to these points will not fail to put the judges to the test; they cannot pass over such a stand, and give a prize for size to a stand with a single really blemished bloom, while any stand is free—we do not mean free from blemish altogether, for that is impossible, but we mean free from those distinctive faults which ought to turn out a stand. There is not half so much fault in the run petal of a pink, as in the eye of a Pansy breaking into the margin; yet a run petal is fatal to the finest stand in the world; and so, in the case of the Pansy, ought a broken field, that is, a field broken by the eye breaking through it to the margin.

There may be a good deal done by arrangement in a stand. The Pansy should be so arranged that the yellow grounds, white grounds, and selfs, should be uniform, and separated from each other. No two whites or yellows should come together, except in the centre of the stand—yellow at the ends of the top and bottom rows, and white at the ends of the middle rows; or if there be four rows, yellow at the ends of the first and third, and white in the second and fourth. There is such want of contrast, want of taste, want of common sense, in nine-tenths of the stands, that we often wonder that they get prizes at all—half-a-dozen white grounds are crammed close together, and perhaps yellow ones as conspicuously assembled in another part; here and there a muddy self; and perhaps there a fine flower, with one shade of colour in the bottom petal, and another in the side petals; a struggle sometimes between a dirty white and a yellow—the last point that the cultivators for sale would give up, yet an admitted fault, though conspicuously shown to the present day, by retaining varieties that should be banished altogether.

There can be no doubt, that if any one amateur grower would stand to this, the judges must place all others for a time below him. It is clear to us, that so long as exhibitors will put in a single bloom with a disqualifying defect, the stand is, by right, as much out of the competition as if it had twenty blemished flowers. The old dogma is a good one: you show—for it is applied to all flowers—you show twelve flowers for a prize; one of the twelve has a fault, which, by common consent, makes it not a show flower—*ergo*, you only show eleven flowers, and these cannot compete; and the carelessness of judges has become a nuisance, and a wet blanket on progress. It has arisen at great shows, where there is a money-getting interest to serve; and so long as the quantity of flowers cover the tables, and gratify the public, who pay for admission, the committees are useless. The judges are not selected as they are at those social meetings where the laws are rigidly enforced; therefore blemishes which would not be tolerated an instant, in a meeting of true florists, are passed over at the great exhibitions, so that the subjects are showy and attractive. It is not too much to say, that the great exhibitions have thrown a damper on the culture of those flowers which are not very showy; and they have encouraged monstrous specimens, instead of healthy and natural growth, simply because they make a greater show on the tables. All small things, like Pansies, which are to be placed on a stand occupying two or three feet of superficial space, are by no means adequately encouraged; and Geraniums, which, when grown as large as they can be without sticks would not be large enough, are encouraged of a monstrous size, and bad growth, which would not be shown at all except that the growers are allowed to put a hundred props to support the branches and flowers in their places.

Miscellaneous Notices.

CALEDONIAN HORTICULTURAL SOCIETY.

May 11.—The Spring Competition Meeting was held in the Society's Garden, Inverleith. The display of Exotic and Spring flowering plants was good, and many of the specimens evinced high culture. The nurserymen's prize for Shrubby Greenhouse plants, was gained by Messrs. Dickson & Sons, Inverleith, who had Hovea Celsi, Chorozema Lawrenceana, Bossiæa linophylla, Platylobium rhombifolium, Podolobium staurophyllum, and an Azalea. The first prize, in the competition among practical gardeners, was awarded to Mr. J. Reid, gardener to Prof. Syme, Millbank, for beautiful specimens of Tetratheca verticillata, Chorozema Lawrenceana, Azalea lateritia grandiflora, A. Gladstanesii, Epacris miniata, and Pimelea Hendersonii. A prize for the three finest stove plants (Orchids and Cacti excluded) was awarded to Mr. H. Ritchie, gardener to W. M. Innes, Esq., Parson's Green, who had Gesnera splendens, Begonia coccinea, and Balsamina latifolia. A fine flowered specimen of Tropæolum tricolor, was shown by Mr. C. Douglas, gardener to H. Craigie, Esq., Falcon Hall; and for the two finest dwarf Cacti, the first prize was gained by Mr. J. Pender, gardener to D. Anderson, Esq., Moredun, who produced finely flowered plants of Epiphyllum glaucescens and E. Hitchinii. For Tropical Orchids an award

was made to Mr. J. Thomson, gardener to Dr. Neill, Cannonmills, who had a fine specimen of Trichopilia tortilis, bearing eighteen expanded flowers.

The first prize for Auriculas was gained by Mr. A. Forrester, Ratho, whose kinds were Ne Plus Ultra, Fletcher's Mary Ann, Sykes Complete, Lord Brougham, General Morello, and Thompson's Revenge; and a second by Mr. R. Grieve, Liberton, for Stretche's Alexander, Harrison's William Pitt, Eclipse, Smith's Waterloo, Ringleader, and Stretche's King. Messrs. James Dickson & Sons' prize for Cinerarias grown in 8-inch pots, was contested by five competitors; and was awarded to Mr. J. Henderson, gardener to C. K. Sievewright, Esq., Cargilfield, for Bessy, Carlotta Grisi, Eleanor, Nymph, Delight, and Newington Beauty. A second prize was voted from the Society to Mr. Ritchie, Parson's Green, for Adela Villiers, Cerito, Flora MacIvor, Delight, Climax, and Pauline.

There was a splendid display of productions sent for exhibition only, of which the most remarkable were:—From Messrs. Dickson & Co., Leith Walk, a splendid Erica vestita alba, Gompholobium polymorphum, Leschenaultia Baxteri major, and Acacia platyptera; with a basket of interesting Alpines. Messrs. J. Dickson & Sons, Inverleith, a fine Gloxinia grandis, Mimulus sibiricus, &c. Mr. Carstairs, Warriston, fine Geraniums, Heaths, Cinerarias, and Epacrises. Mr. Stark, Edgehill, the beautiful Cheiranthus Marshallianus. Messrs. Downie & Laird, 2 boxes of beautiful Cinerarias. Mr. Methven, Stanwell Lodge, several seedling Rhododendrons, one of which, a beautiful white-flowered variety, was stated to be perfectly hardy. Mr. MacIntosh, Regent Road, two fine Pimelea spectabilis Messrs. Ballantyne & Son, Dalkeith, the Rose Geant de Batailles. Lady Hay, Kingsmeadows, Peebles, fine collection of Azaleas. Professor Dunbar, a large Scarlet Hybrid Rhododendron named R. Dunbarianum. I. Anderson, Esq., Maryfield, a beautifully flowered Rhododendron formosum, Nemophila maculata, and a new hardy Conifer from Australia. Dr Neill, a fine Myrtle-leaved Orange, bearing a profusion of flowers and fruit, and some interesting Alpine plants. Professor Syme, a fine specimen of Pentstemon Cobea, and Nemophila maculata. Messrs. Dickson and Turnbull, Perth, a Scarlet Rhododendron, raised from Himalayan seeds. Mr. Baxter, gardener, Riccarton, a fine display of Border Auriculas, raised from seed, many of them very beautiful. Mr. Stirling, Moray Place Gardens, rare Alpines, with flowering plants of Primula Stuartii, and Houstonia cœrulea. There were also exhibited, from Mr. G. Aitken, Dalkeith, a new Syringe, invented by him; and from Mr. Kelly, Tanfield, an improved Edging Iron for paring curved figures.

Peculiarities of Palms.—There is considerable uniformity in the shape of the leaves of Palms; they are generally either pinnate (divided like the plume of a feather), or else palmate, or palmo-digitate (of a fan-like form). The leaf-stalk is, in some species, without spines, in others, sharply toothed. The form of the leaf in Caryota urens, and Martinezia caryotifolia (which we saw on the banks of the Orinoco and Atabapo, and again in the Andes, at the pass of Quindiu, 3,000 French —3,197 English—feet above the level of the sea), is exceptionable, and almost unique among Palms, as is the form of the leaf of the Gingko among trees. The port and physiognomy of Palms have a grandeur of character very difficult to convey by words. The stem, shaft, or caudex, is generally simple and undivided; but, in extremely rare exceptions, divides into branches in the manner of the Dracænas, as in Crucifera thebiaca (the Doum Palm), and Hyphæne coriacea. It is sometimes disproportionately thick (as in Corozo del Sinu, our Alfonsia oleifera); sometimes feeble as a reed (as in Piritu, Kunthia montana; and the Mexican Corypha nana); sometimes swelling towards the base (as in Cocos); sometimes smooth, and sometimes scaly (Palma de covija o de sombrero, in the Llanos); sometimes armed with spines (as Corozo de Cumana, and Macanilla de Caripe); the long spines being distributed with much regularity in concentric rings. Characteristic differences are also furnished in some species by roots, which, springing from the stem, at about a foot or a foot and a half above the ground, either raise the stem, as it were, upon a scaffolding, or surround it with thick buttresses. I have seen Viverras, and even very small monkeys, pass underneath this kind of scaffolding, formed by the roots of the Caryota. Often the shaft or stem is swollen only in the middle, being more slender above and below, as in the Palma Real of the Island of Cuba. The leaves are sometimes of a dark and shining green (as in Mauritia and Cocoa-nut Palm); sometimes of a silvery white on the under side (as in the slender Fan Palm, Corypha miraguama, which we found in the Harbour of Trinidad de Cuba). Sometimes the middle of the fan or palmate leaf is ornamented with concentric yellowish or bluish stripes like a peacock's tail, as in the thorny Mauritia, which Bonpland discovered on the banks of the Rio Atabapo. The direction of the leaves is a character not less important than their form and colour. The leaflets are sometimes arranged like the teeth of a comb, set on in the same plane, and close to each other, and having a very rigid parenchyma (as in Cocos, and in Phœnix, the genus to which the Date belongs), whence the fine play of light from the sun-beams falling upon the upper surface of the leaves (which is of a fresher verdure in Cocos, and of a more dead and ashy hue in the Date Palm); sometimes the leaves are flag-like, of a thinner and more flexible texture, and curl towards the extremities (as in Jagua, Palma Real del Sinu, Palma Real de Cuba, and Piritu dell' Orinoco). The peculiarly majestic character of Palms is given not only by their lofty stems, but also in a very high degree by the direction of their leaves. It is part of the beauty of any particular species of Palm, that its leaves should possess this aspiring character; and not only in youth, as in the case of the Date Palm, but also throughout the duration of the life of the tree. The more upright the direction of the leaves, or, in other words, the more acute the angles which they form with the upper part, or continuation of the stem, the grander and more imposing is the general character and physiognomy of the tree.—*Humboldt's Aspects of Nature.*

Cheiranthus ochroleucus
var Marshalii

CHEIRANTHUS MARSHALLII.

Nat. Order, CRUCIFERÆ.

GENERIC CHARACTER.—Cheiranthus, Br.—*Calyx* of four connivent sepals, the two lateral saccate at the base. *Corolla* of four petals, hypogynous, clawed, with a spreading obovate or emarginate limb. *Stamens* six, hypogynous, tetradynamous, not toothed. *Stigma* deeply two-lobed, the lobes recurved. *Siliqua* two-valved, four-sided, or bilaterally compressed, valves one-nerved; *placentas* obtuse on the back; replum without nerves. *Seeds* numerous, in one row, pendulous, ovate, compressed, immarginate or margined; funiculi filiform, free. Exalbuminous embryo, with flat cotyledons *accumbent* on the ascending radicle. (*Endlich. Gen. Plant*, 4848.)

CHEIRANTHUS MARSHALLII, Marshall's Cheiranthus.—Hybrid, between Cheiranthus ochroleucus and Erysimum Peroffskianum?

DESCRIPTION.—A half-shrubby herb, one foot to eighteen inches high, with erect angular branches, clothed, like the leaves, with appressed forked hairs. Leaves crowded at the lower part of the stems, more distant upwards and on the flowering stems; upper leaves narrowly lanceolate and acute, with a few teeth; the lower leaves attenuated downwards into a long, narrowly winged, stalk-like base, and becoming more or less spathulate. Inflorescence at first corymbose, elongating into a raceme. Calyx of four erect sepals, the two lateral deeply saccate at the base. The four petals with a somewhat orbiculate spreading limb, suddenly attenuated into a long, narrow claw, deep clear orange at first, becoming rather paler, scented (the odour resembling a combinaton of those of the Violet and Primrose). Stamens tetradynamous, with a bifid gland between each pair of long stamens. Siliqua four-sided; stigma two-lobed. Seeds with *accumbent* cotyledons.

The subject of our plate is a very interesting and remarkable plant, said to be a hybrid between Cheiranthus ochroleucus and Erysimum Peroffskianum; and it does undoubtedly exhibit a combination of the characters of the two plants. In the form of the envelopes of the flower, and in the forked glands which appear to represent abortive stamens completing the circle of four with the two shorter ones, it agrees much more closely with Erysimum than with Cheiranthus; but in the seeds we find the peculiar character which belongs to the Cheiranthus as one of the Pleurorhizous tribe,—that the radicle is applied against the edges or sides of the cotyledons, while in Erysimum the radicle is folded on to the back of one of the cotyledons. This, therefore, appears to be a very remarkable case of hybridation, occurring not merely between plants of different genera, which is already exceptional to the ordinary rule, but between genera in which there is a most important difference in the seeds. It deserves careful investigation; and the further history of the ripe seeds (which we have not had an opportunity of examining) should be carefully observed.—A. H.

HISTORY &c.—This very beautiful plant was raised by Mr. John Marshall of Limburn. It was obtained as we are informed, by fertilizing the dwarf primrose-coloured Cheiranthus ochroleucus, with the deep orange Erysimum Peroffskianum; and, in appearance, is exactly intermediate between these very distinct looking plants. Mr. Marshall "was led to cross the Cheiranthus ochroleucus, in consequence of the difficulty of getting seeds from it; the few seeds which resulted from this fertilization were sown in the open border in 1846, and the plants first bloomed in 1847," one of them proving to be the variety now figured. From the same batch of seeds, three other varieties were obtained, one like ochroleucus, and the others with orange-coloured flowers. One of these orange-flowered sorts was lost; the other which is much like Marshallii, grows eighteen inches high, but neither the truss nor the flowers are so large as in that variety. Mr. Marshall has also bloomed four plants raised from Marshallii, all slightly different in colour, height, and foliage, but inferior to their parent. At Limburn the plant flowers about the latter end of May, in the open air. The stock of this charming variety is now in the possession of Mr. R. M. Stark, of the Edgehill Nursery, Edinburgh, and our drawing was made from a plant communicated by Mr. Stark, early in May of the present year. The fresh flowers are very agreeably violet scented, blended with a little of the fragrance of the primrose.

CULTURE.—Like its parent—the Cheiranthus ochroleucus, this hybrid, should be annually renewed by propagation. For this purpose cuttings should be taken as soon as the young shoots are produced after flowering, and these should be planted in light sandy soil, under

a handglass in a cool situation. Taken off about June or July, and treated in this way, the cuttings make good strong plants for bedding out early in autumn. This mode of propagation by cuttings, is that which will no doubt have to be generally resorted to, for we learn by a communication from Mr. Marshall, now before us, that the plants do not seed freely; out of twenty large plants, he was only able to save ten or a dozen seeds in one season. It appears also that seedlings are liable to vary, so that although it may be desirable to save what seed can be secured, for the chance of obtaining from them improved varieties, yet the perpetuation of the beautiful variety now under notice, will only be effected by having constant recourse to propagation by cuttings.

We are informed that the plant is quite hardy. Young plants raised from cuttings in summer, and bedded out in autumn, come into flower in the open border, about the same time as C. ochroleucus; and, by cutting off the flowers as they decline, they continue flowering on a great part of the summer. At Limburn, the plants in the open air come into flower towards the end of May; and Mr. Marshall states that some of his plants from which the fading blooms were constantly removed, were not out of flower before November. From its habit, its splendid colour—unapproachable in fact by any artificial colouring material, and exactly answering to the rich orange of Erysimum Peroffskianum, diluted by the clear yellow of Cheiranthus ochroleucus,—its continuance in bloom, and its fragrance, we think it must prove a very favourite plant for bedding out in the flower-garden.

For one purpose it must always be a favourite—that is, for pot culture, for the purpose of furnishing drawing-rooms, balconies, &c. For this object, the cuttings, when rooted, must be potted, instead of being planted out in beds, and they must be sheltered in cold frames during winter. The plant from which our drawing was made, which had been grown in a pot, was in bloom by the beginning of May; and no doubt it may be had in flower earlier than this; but on this point we have no experience. Whether grown in pots or in beds, it should have a good loamy soil, well enriched by the addition of decayed leaves.—M.

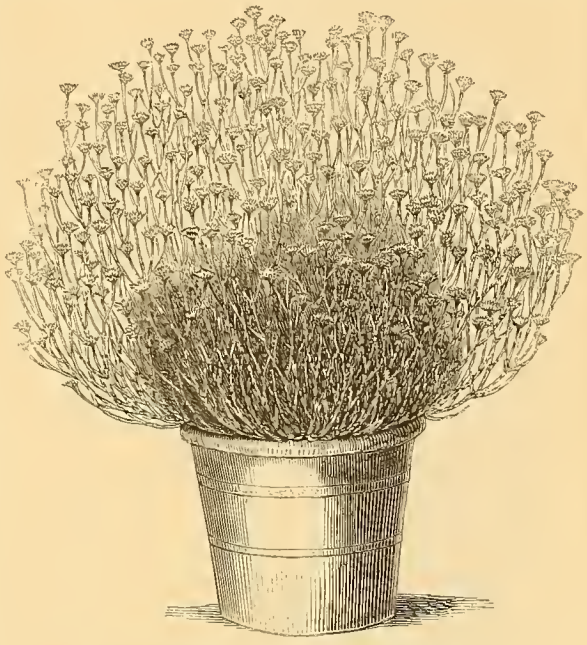
HORTICULTURAL SOCIETY'S JUNE EXHIBITION.

THE exhibition which took place on the 8th instant was well attended; and though, as a whole, inferior to that of the 18th of May, yet, in many points, it was highly satisfactory. The Orchids, the Pelargoniums, and the mixed "collections," were the leading features. The fruit was very limited in quantity, and presented nothing remarkable as to quality.

The visitors were, on this occasion, as formerly, gratified with a sight of the glorious Water-lily of the New World, two leaves and a blossom being exhibited, from Syon, by Mr. Ivison, gardener to the Duke of Northumberland; one of the leaves was floated so as to show the upper surface, the other was reversed to show the remarkable network of ribs and veins spread over the under surface. The other novelties—for, amongst novelties, we still rank the Victoria regia, just mentioned—were not numerous; the most important was the fragrant stove shrub Roupellia grata—also a good example of culture—contributed by Mr. Cole, gardener to H. Colyer, Esq.; of this we shall shortly publish a figure. Messrs. Veitch had the Rhododendron jasminiflorum, previously mentioned; a plant of the not new, but pretty Dipladenia nobilis; and Nepenthes sanguinea, a dwarf plant, but having four pitchers fully grown, and showing its deep red-brown externally, irregularly marked inside with the same colour. Mr. Ivison sent a Bejaria, imported from St. Martha: it forms a dense evergreen shrub, with oblong, lance-shaped leaves, and short, crowded, terminal racemes of flowers, which resembled some of the tube-formed alströmerias in shape, but are of a pretty rose pink, becoming white at the tips. Dielytra spectabilis, one of the most beautiful of herbaceous plants, and believed to be hardy, came from Mr. Mountjoy, of Ealing; and another showy, herbaceous, hardy plant, the Campanula nobilis alba, was communicated by Mr. E. G. Henderson, of St. John's Wood.

In the two rival "large collections" of stove and greenhouse plants, which were staged, the merit was very nearly balanced. The exhibitors were, Mr. May, gardener to Mrs. Lawrence, and Mr. Cole. Mrs. Lawrence's plants were very uneven, both as respects size and merit; the most conspicuous among them were three immense bushes of Polygala acuminata, Coleonema rubrum, and Epacris grandiflora. There was a very pretty plant of the rare Chorozema ovata; and the plants of Ixora coccinea, Dracophyllum gracile, Adenandra fragrans, Boronia serrulata, Leschenaultia formosa, and

Aphelexis spectabilis grandiflora, were good specimens of moderate size. The blemishes of the collection were an Allamanda, drooping from too sudden exposure, a fading Pimelea spectabilis, and an Azalea variegata, in which the well-bloomed body of the plant was spoiled by unbloomed growth beyond. Mr. Colyer's plants were beautifully fresh, and possessed great merit throughout, though wanting the monster specimens, captivating to the eye, found in the rival group. Here, however, was a fine Allamanda Schottii; Dipladenia crassinoda, admirably bloomed; two very fine Ixoras, crocata and coccinea, freely bloomed; Clerodendron fallax; a lovely Pimelea Hendersonii; Chironia glutinosa, brilliant with its deep rose-pink blossoms; a good Stephanotis floribunda; Aphelexis spectabilis grandiflora. Messrs. Fraser and Pamplin also had collections of twenty; in the former of which was a fine specimen of Rhyncospermum jasminoides, a showy plant of Hibbertia Cunninghamii, and Lachnæa eriocephala. Groups of fifteen were sent by Mr. Green, gardener to Sir E. Antrobus, and Mr. Gerrie, gardener to Sir J. Cathcart, the former of whom had a massive Leschenaultia formosa, Allamanda grandiflora, very well flowered; and a fine Ixora coccinea. Among the smaller groups were scattered many fine examples of cultivation; those which especially attracted our notice were the following:—Tetratheca verticillata, dwarf, and a full yard in diameter, from Mr. Kinghorn, gardener to the Earl of Kilmorey; Acrophyllum venosum, small, but freely grown and flowered, together with a well-flowered Gompholobium polymorphum, from Mr. Bruce, gardener to B. Miller, Esq.; a very dwarf Clerodendron fallax superbum, with two large panicles of flowers from Mr. Speed, of Edmonton; Pavetta Caffra, Dracophyllum gracile, and Aphelexis spectabilis grandiflora, from Mr. Taylor, gardener to J. Coster, Esq.; Pimelea Hendersonii, from Mr. May, gardener to E. Goodhart, Esq., Mr. Epps, of Maidstone, and Mr. Stanley, gardener to H. Berens, Esq.; Medinilla speciosa, and a dwarf Ixora from Mr. Carson, gardener to W. F. G. Farmer, Esq.; a dwarf Ixora, from Mr. Hamp, gardener to J. Thorn, Esq.; Aotus gracillima, from Mr. Malyon, gardener to T. Brandram, Esq.; Bossiæa linophylla, from Mr. Stuart, gardener to T. Huggins Esq., Norwood; and Coleonema pulchrum, from Mr. G. Young, gardener to C. Barron, Esq. Among the specimen plants were Polygala Dalmaisiana and Leschenaultia biloba grandiflora, from Mr. May, gardener to Mrs. Lawrence; Indigofera decora, Platycerium grande, and Nymphæa cœrulea, from Mr. Ivison; and a Coleonema pulchrum, from Mr. Terry, gardener to Lady Puller.



APHELEXIS SPECTABILIS GRANDIFLORA exhibited by H. Colyer, Esq.

The best lot of Cape Heaths came from Mr. Smith, gardener to W. Quilter, Esq., of Norwood, whose plants were large, cleanly grown, well matched as to size, and in full bloom; the most attractive plants were vestita alba, vestita coccinea, elegans, and suaveolens among the larger specimens, and bruniades rather smaller in size. Mr. Cole had a nice collection, in which were conspicuous plants of mutabilis and Cavendishiana; and Mr. Leach's group, which though good were too uneven in size, contained a large Cavendishiana, and a neat jasminoides. Among the Nurserymen's plants, Mr. Epps had striking specimens of vestita coccinea, propendens, and splendens; and good collections including many fine specimens were sent by Messrs. Veitch, Rollisson, and Fairbairn. There were some very pretty groups of small plants shown in 11-inch pots.

Among the seedlings, was a fine Epiphyllum named platypetalum from Mr. Hoyle of Reading; it is a large rich deep crimson variety, with remarkably broad thick petals, and will become a very showy and favourite sort. Mr. Epps had a seedling Erica, named tricolor Eppsii, a distinct and very fine variety, with short thick tube much inflated at the base, and there deep red, the throat green, the

limb white; with it was tricolor splendens, in the same way but less inflated, the red paler, and the limb suffused with green; also Gardneriana, a sort in the way of ampullacea, with deep flesh-coloured tube, dark throat, and whitish limb. Messrs. J. and C. Lee, had a seedling Azalea indica named Symmetry, a large smooth flower, of fine form and substance, good habit, the colour a pale vermilion red; it promises to be a first-rate kind. Mr. E. G. Henderson, had some varieties of Campylia holosericea, of which those called oculata—dull crimson and lilac, with deep red eye, and roseo-alba—rosy lilac with white eye, were the best. Messrs. Garraway and Co. sent Achimenes grandis, a cross between Leipmanni and longiflora, and having large deep purple flowers.

Foremost in the large assemblage of fine exotic Orchids was the specimen of Camarotis purpurea, represented in our woodcut: this plant formed a flowery pyramid five feet in height, and had a most beautiful appearance. The large collections were shown by Mr. Mylam, gardener to S. Rucker, Esq.; Mr. Blake, gardener to J. H. Schröder; Esq.; and Mr. Williams, gardener to C. B. Warner, Esq. In Mr. Mylam's group were fine plants of:—Odontoglossum citrosmum, with five racemes; Aërides affine and odoratum; Vanda teres; Saccolabium præmorsum; a dwarf Dendrobium formosum, having seven bunches of bloom; Cypripedium barbatum, with eleven flowers; and several Cattleyas, of which candida, violacea, and intermedia were the most uncommon. Mr. Blake had Aërides Schroderi, a highly coloured variety, approaching maculosum, together with a good Saccolabium guttatum, and several other species of Aërides. In Mr. Williams's lot were plants of Cœlogyne Lowii, and Epidendrum aurantiacum. The nurserymen's collections of fifteen were sent by Messrs. Veitch, Rollisson, and Dobson; the former of whom had a Sobralia macrantha superba with fourteen flowers, very gorgeous; Laeæna bicolor, and Saccolabium præmorsum. Messrs. Rollisson had a large Aërides odoratum, and good plants of Dendrobium formosum and moschatum, with Huntleya violacea. Among the smaller groups was a fine Stanhopea oculata, from Mr. Gerrie, which, besides a few expanded blooms, had twenty-three spikes in various stages of progress; a rich-lipped Cattleya Mossiæ, from Mr. Franklin, gardener to Mrs. Lawrence; and a fine specimen of Cattleya Mossiæ, a very deeply coloured variety, from Mr. Kinghorn. Mr. Carson had Odontoglossum grande, and a large Aërides odoratum majus.

CAMAROTIS PURPUREA:
exhibited by R. S. Holford, Esq.

The Pelargoniums were staged in very fine condition, and produced a grand display. A silent hint, however, was, we saw, conveyed to those who have clamoured about showing Pelargoniums—and the mania has spread to other subjects—*without* stakes. A year or two ago, Mr. Forster's plants were brought to exhibition expressly without supports, and were specially noticed and commended on that ground; this year Mr. Forster's plants are tied up after the common plan which exhibitors find it necessary to follow. Mr. Cock's plants again evinced remarkable growth. The contributors were Messrs. Cock, Black, Beck, Robinson, Gaines, Stains, and Bragg; and the most remarkable plants we saw, were:—Star, Emily, Delicatissima, Pearl, Gulielma, Sikh, Centurion, Alonza, Constance, Gypsey Bride, Salamander. The fancy Pelargoniums were remarkably fine, especially the plants shown by Mr. Robinson, one of which we have sketched; some of these plants were nearly four feet in diameter. We noted the most distinct and beautiful sorts in this part of the exhibition, as follows:—Madame Meillez, Anais, Fairy Queen, Reine des Francais, Queen Superb, in Mr. Robinson's group; Hero of Surrey, Reine des Francais, Orestes, in Mr. Gaines'; Jenny Lind, Ibrahim Pacha, Defiance, in Mr. Ambrose's; Jehu Superb, in Mr. Stains'. Several collections of the species of Pelargonium, and of Florist's Calceolarias were shown. Another good group of Amaryllises was sent by Messrs. Garraway and Co.; and 2 boxes of very pretty English Irises were from Mr. Salter of Hammersmith. The pot Roses were tolerably fresh, but inferior to those produced in May. The plants most remark-

able were, Comtesse Mole, Marie de Champlonis, Souvenir d'un Ami, Meillez, Devoniensis, from Messrs. Lane; Blairii No. 2, Mrs. Elliot, from Mr. Francis; Beauty of Billiard, from Mr. Rosier; Coupe de Hebe, from Mr. Terry.

Collections of Indian Azaleas, of Cacti, of Helichysums, of Alpine plants, and of variegated plants, completed the floral display.

The Fruit, as already mentioned, was not remarkable for superior quality. The best Pines were Providences weighing 9lbs. 11ozs., from Mr. Chapman, gardener to J. B. Glegg, Esq., and Mr. Davis, gardener to Lord Boston. Very good samples of Black Hamburgh Grapes, as to size, were from Messrs. Frost, gardener to Lady Grenville; Stent, gardener to W. Herbert, Esq., Clapham; Foggo, gardener to the Marquis of Abercorn; Rust, gardener to J. Maclaren, Esq., and Davis, of Oakhill; but none of them were well coloured. A good sample of Black Prince came from Mr. Chapman, gardener to J. B. Glegg, Esq.; of Sweetwater from Mr. M'Walter, gardener to Col. Challoner, and Mr. Chapman of South Lambeth; of Muscat from Mr. Toy of Oatlands; and there were several dishes of well-grown but unripe Muscats. Some good Peaches came from Mr. Chapman—Gross Mignonne; and Mr. Robertson, gardener to the Marquis of Waterford—Royal George; and a dish of finely-ripened Brown Turkey Figs came from Mr. Foggo. Some good British Queen Strawberries came from Mr. Busby, gardener to S. Crawley, Esq. Various good-looking Melons of the Hybrid Persian, and Beechwood sorts were produced; and a Beechwood of 6 lbs. 8 oz. came from Mr. Carson.

PELARGONIUM—QUEEN SUPERB: exhibited by J. Simpson, Esq.

THE TYING DOWN SYSTEM WITH FRUIT TREES.

By Mr. R. ERRINGTON, Gardener to Sir P. M. Egerton, Bart., Oulton Park, Cheshire.

THIS, the only system in practice, which does not run counter to the natural habits of our out-door fruits, is not so generally known and practised as its merits deserve; and although much has been said concerning it in some of our gardening periodicals, yet all have not given the subject a thorough consideration. I beg, therefore, to draw the attention of the readers of the *Gardener's Magazine of Botany* to this excellent practice, and I am the more emboldened to do so, from the fact of having practised it for the last twelve years; in addition to which, I trust I may without egotism, lay claim to being, if not the original inventor, at least the systematiser of this mode of training.

It is astonishing to observe what a slow progress anything exceedingly simplified makes with one portion of the public, in comparison with others which carry some marks of complication on the face of them; and which marks are, to those incapable of grappling with the main features of a question, (and of dealing with elementary principles rather than floundering amongst details) too often mistaken for the impress of science.

Thus, some years since, it was the custom to seek for success in fruit culture in an elaborate and tedious routine of winter pruning; and our horticultural periodicals of the day teemed with illustrations of the fearful course the amateur fruit cultivator had to submit to, for a period of some half-dozen years, before he could hope to produce a good dessert. In such works might be found, first,

second, third, fourth, &c., year's pruning, with endless references to spur eyes, &c., assiduously classified as to character, and which were, (or *ought to have been*,) fruitful in a given period.

All this really looked a very smart affair assuredly, on paper, but many an unhappy wight soon found to his cost, that these spurs were somewhat intractable, and that their character was liable to be changed of a sudden, by wet and growing periods, by spade culture and manuring; or even by injudicious pruning or disbudding. For my own part, I never strictly followed these arbitrary practices; but, about that period, I began seriously to consider whether some less artistic practice could not be established—some practice going *with* the tendencies of the tree, instead of against them; and which "he who runs may read."

Such then is the "tying down" system; a name, to be sure, not fully descriptive of the whole merits of the practice, but which having become in some degree established, may perhaps as well remain undisturbed. As the name implies, it consists mainly in tying down a considerable amount of the young spray annually, during the spring and summer culture instead of cutting it away, in the vain endeavour to *force* the trees to bear on spurs.

In detailing my mode of procedure, it may be premised, that it becomes necessary under this system to place the leading shoots further apart than usual; for, as an increased amount of foliage is produced along the leading branches, it becomes necessary to obtain as much light as possible on all sides. I consider that nine inches is necessary for Pears, Plums, and Cherries; in some cases a trifle more, or a trifle less, according to the size of the foliage. One point must here be adverted to, as we proceed, and that is, that the leaders being placed at systematic distances, are considered more as mere ducts than as the producers of fruit in themselves. They, therefore, become at once the source of a perpetual supply of young shoots, and also a living trellis, whereon to train their offspring.

The *strict* fan mode of training, is therefore not *quite* the thing for carrying out this system completely, inasmuch as the acute angle, formed by the point of divergance of any two given branches, has a tendency to huddle the young spray too closely; or, in fact, to intercept, by their being in contact, the action of the sun on the wall, in the case of wall or fence trees; which action I am accustomed to consider a collateral advantage of no mean weight; for the wall, during sunny weather, becomes a reservoir of heat, to be given out during the night in a progressive manner, thus qualifying atmospheric extremes.

The mode of training the main branches I have for years practised, with the tying down system, is what may be termed the curved fan; for, although the branches at their junction with the main stem or collar, commence their radiating course in direct lines, they are made to fall in with the horizontal courses of the wall, at about a foot from the junction with the collar; and thenceforward, they continue in parallel lines. I name this, in order to show that the system, as pursued by me, is in a *trifling* degree incomplete; those who want to carry it completely out, will be necessitated, perhaps, to adopt the old plan of Pear training, viz., of carrying up a central leader, and causing the side branches to diverge at right angles to the main stem from the bottom of the tree to the top.

In commencing to train young trees then, in order to carry out this system, my practice is in accordance with an old apothegm, as applied to the formation of a hedge; and which, as a maxim, is none the worse for wear—"always make the bottom first." The training of the main leaders commence at the lower part of the wall; the first pair of shoots right and left, being strictly parallel with a course of bricks about nine inches above the ground level. The next pair take a slight divergence just above the collar, and each pair more so, as the tree ascends.

Although I spoke of this mode of training as being perhaps slightly incomplete, (inasmuch as the want of a strict parallelism through the whole course of the main leaders does not give every portion a perfect equality as to the admission of light); yet it has one advantage, as I presume, in compensation. I mean the tendency to an equalisation of the sap, produced by the progressively increasing amount of divergence in the main leaders, as they are situated higher up the tree. Another advantage too attaches to this mode, beyond that of forming the whole tree from one perpendicular shoot—I generally reserve two or three shoots, whilst the tree is young, as a nursery in, or about, the centre of the tree. These are pruned back in the winter for a season or two, in order to produce at the necessary point of divergence the side leaders, which are to complete the form of the tree. By the old perpendicular mode, it is well known, that it required some years to establish a tree; but, by departing thus far from a mere mathematical nicety, a tree may be made to cover a given space in one half the time; a matter of great importance with thousands, especially amateurs.

Thus far then, as preliminary to the principal issue of our subject, I would now show, in a brief, yet explicit way, how the "tying down" system is carried out: premising, in the first place, that I am not undertaking to teach experienced professionals, but rather those, who, having little to

unlearn, would fain commence by laying hold of principles, rather than mere rules. In order, then, to see our subject clearly, we will suppose the form of tree before adverted to, and that several of the main branches, right and left, have been conducted into their proper lines; in other words, we will take up the practice about to be suggested, at about the second or third year from planting. Every one who has had the least to do with trained fruit trees knows, that in their earlier periods, there is a natural tendency, in the two or three years' old wood, to produce, what are termed by practical men, "*natural spurs*," and could this habit be continued for several years, all would be well: people would not require to be advised about "tying down" systems. It so happens, nevertheless, that the true, or natural spurs become scarce in proportion as the tree extends, at least, near the centre of the tree; towards the terminal points, things continue all right. Now, here arises the principal problem, viz., how to keep the tree clothed equally with blossom-buds, walls being expensive things. What is termed "spurring back," at the winter's pruning, never did, and never can succeed: the knife is a much more likely agent to produce wood shoots, than natural spurs. Every gardener of experience knows full well how unsatisfactory the old "spurring back" has ever proved. I have before adverted to the tendency in the two and three years' old shoots, to produce the natural spur. This habit is common to nearly all our spur-bearing fruits, and the thorough perception and recognition of this fact, many years since, led me to break with the ancient practice of "spurring back."

To return, then, to the main subject in hand, the months of May and June are the proper periods when all these fruits should receive a close examination; disbudding ought to be practised more or less in every trained fruit tree, and now it is, whilst the practice is proceeding, that a careful selection should be made of those shoots required for tying down. It was before observed, that the main leaders are to be used when established, as a trellis, in preference to nailing the shoots in the intervening spaces, and that this is done in order to permit parallel lines of the wall, all over the tree, to become heated by the solar rays.

The disbudder, therefore, commences operations by merely removing the awkward, or gross shoots, providing they can be spared. This done, the trees should remain unmolested for a week or two, for most fruit trees are averse to a too heavy and sudden disbudding; and, besides, the operation is performed with more precision at intervals, especially if the young shoots are thick. At the next stage, a selection may at once be made, and the simplest way to perform this, is to trace each branch of the tree from the bottom upwards, and to merely pinch the point off every shoot not required for tying down. The selection must be, of course, made with judgment; and, in all cases, early, and short-jointed shoots must be preferred to those long-jointed and succulent, which late made shoots (forced into being by an over powerful root action, through rainy weather, or otherwise) generally are. Such have a strong tendency to enlarge the fabric of the tree (a matter not needed), but are averse altogether to the formation of blossom buds. Those principals are of equal application to all our spur fruits, as far as my experience goes; but the distinction is more manifest in some kinds than in others.

All gross shoots, or robbers, as some term them, had better be stripped clear away, unless required to produce shoots to furnish blank spaces, in which case it is merely necessary to pinch out their points when they are about five or six inches in length; and this stopping should be performed as early in the season as possible, in order that the side shoots produced by them, may become well ripened, and that a too violent root action be not encouraged; which latter would derange the equilibrium of the tree in the ensuing season.

The above proceedings will bring the operator to the middle of June, or nearly so, and now the tying down should commence as soon as possible, or the fruit spurs for the ensuing season will be too much shaded, and imperfect blossoms will be the result. The young spray may be tied down in a continuous way, the whole length of the branches, and whether they are tied singly, or a couple together, occasionally, must depend on the character of the young shoots; care must be taken to reserve all that carry those criteria of fruitfulness before adverted to; and where one shoot is overtaking another, and creating confusion, the point may be pinched off without hesitation.

Trees in a healthy state will yet produce a late growth of watery spray, especially if the weather prove rainy, such may hereafter be stripped away, or pinched as it rises, and trees, on such account, should be looked over once a fortnight, during the growing season, in order to keep such disorderly growths within bounds. In the early part of August, I hold it good practice to stop or pinch most of the growing shoots, especially those which are still rambling freely; by so doing, and by suffering the weaker shoots to grow until autumn, much may be done towards keeping the strength of the trees equalised. Such practise will also tend to bring on a somewhat earlier rest, thus solidifying the wood, a matter of much importance to tender fruit trees.

Miscellaneous Notices.

Gilliflowers: Cocardeau and Empereur.—Under the name of *Cocardeau* there was formerly cultivated a variety of the large Gilliflower (Mathiola incana), which botanists had named, M. fenestralis. This plant was in much repute in Normandy, and particularly at Caen. At the present day we might perhaps fail in finding in that province, as well as in many others, the variety in question, which was so much esteemed among the florists of an earlier period. It seems almost certain that this Gilliflower in producing its handsome double flowers only in Normandy, must have been neglected, and consequently abandoned like many others, which are no longer to be found in cultivation. The Cocardeau is distinguished from the large species by the stem being very strong and unique, growing sometimes to the height of three feet, and terminating by a flower branch of extraordinary dimensions. There are two varieties of it known, one red, and the other white. M. Lenormand, a skilful grower, of Paris, offered this Gilliflower for sale in the markets of that capital in 1828; and it was conspicuous among all others by its incontestable superiority. For some time he preserved the monopoly of this *Cocardeau*, which he always took to market with double flowers. The variety raised by M. Lenormand took the name of *Cocardeau*, a term which has been long applied to the Gilliflower Cocardeau formerly known. This two-fold use of the term is not likely to lead to confusion, since there is every reason to believe that the old Gilliflower Cocardeau is entirely lost. The modern variety is intermediate between that known as the *Quarantaine* (a small variety known in France); and the *Grosse espece* (another variety of larger size). In respect to its size it comes somewhat near the former, and to the latter by its flowering later, from which circumstance it always flowers the second year. I have, however, often had occasion to sow it early in the spring, perhaps about February, and though my plants were raised in frames, I have never been fortunate enough to flower them before the second year. This variety must then be considered as a biennial. The seed may be sown throughout the spring and summer, and according to the time at which it has been sown, the plants will come up more or less strong. Thus, if the seed is sown in March and April, the plants will come up strong and branchy, and acquire as perfect a development as this variety is capable of. If the seed is sown in May, June, and July, the plants will be less strong, and those of the autumn sowing will have only a single stem or branch. They will all flower in the following spring. The seed is generally sown in a bed like the other Gilliflowers, and when the young plants are strong enough they are pricked out into other beds, in rows twelve inches every way. It is the custom with some gardeners to prick their Gilliflowers a second time with the view of making them more hardy. This practice is only good when we wish to stop a too luxuriant vegetation, but otherwise it disturbs the plants for no use. At the end of September the plants are put in pots and placed for some days in a shady place, in order to encourage them to strike root in the soil. About the time that the frost sets in they should be removed to a cold frame, where they should have as much air as possible, and be kept rather dry, for humidity is more injurious to them than cold. Only two varieties of *Cocardeau* are known, the red and white. It is, however, very likely that other colours might be obtained. The Gilliflower *Empereur* is a superb biennial variety, recently introduced to France. Like the *Cocardeau*, it is of very vigorous habit, furnished with large and very double flowers, of a fine purple rose colour, quite new among Gilliflowers. It flowers almost constantly, and may, therefore, be termed perpetual. It is, perhaps, the greatest acquisition which has been received from Germany. We may also add, as one of its most precious qualities, that nine-tenths of the plants have double flowers.—*Revue Horticole.*

NEW AND RARE PLANTS.

Galeottia beaumontii, *Lindley.* Beaumont's Galeottia. (*Paxt. Fl. Gard.*, i., 12.)—Nat. Ord., Orchidaceæ Vandeæ Maxillaridæ.—Syn., Stenia Beaumontii, *A. Richard.*—An uninteresting stove epiphyte, with oblong pseudo-bulbs, bearing two linear-oblong leaves from the summit, and a two-flowered peduncle from the base; the flowers are dull green and brown, with a pale lilac lip.—From Brazil: Bahia; introduced to Paris, about 1848, by Morel. Flowers in winter.

Tupa crassicaulis, *Hooker.* Thick-stemmed Tupa. (*Bot. Mag.* t. 4,505)—Nat. Ord., Lobeliaceæ § Lobeleæ. Syn., Siphocampylos canus of the *Belgian Gardens*, but not of *Pohl.*—A sub-shrubby warm greenhouse plant, of rather coarse growth, and not very showy. It grows three feet or more in height, the stems stout, woolly, or cobwebby, leafy at the top. The leaves are lanceolate, serrated, four to six inches long, tapering at the base, into a short foot-stalk, tomentose and hairy beneath. The flowers grow singly from the axils of the upper leaves, the corollas having a nearly straight, laterally-compressed tube, two inches long, and a two-lipped limb, the superior one bifid and inclined upwards, the lower one deflexed and trifid; the colour is a yellowish or greenish red, becoming deeper red. Native country not stated; probably Brazil; introduced about 1849. Flowers in summer and autumn. Royal Botanic Garden, Kew.

Calanthe sylvatica, *Lindley.* Wood Calanthe (*Paxt. Fl. Gard.*, i. 25).—Nat. Ord., Orchidaceæ § Vandeæ-Calanthidæ. A beautiful stove herbaceous plant, with the habit and foliage of *C. veratrifolia.* The flowers are larger, in long erect spikes, at first pure white, but by degrees changing to a clear bright yellow; the full-grown plume-like spikes are therefore white at the summit, yellowish at the base, with the intermediate parts cream-coloured. Said to be the most beautiful of all the Calanthes.—From the Isles of France and Bourbon; introduced to Paris about 1848. Flowers ?

Cypripedium Lowii

CYPRIPEDIUM LOWEI.

Nat. Order, Orchidaceæ, ♀ Cypripedieæ.

Generic Character.—Cypripedium, Linn.—*Perianth* six-parted, or, by the coherence of the two lower outer lobes, five-parted, the lobes spreading; the three outer broader, the uppermost broadest, the two lower inserted below the labellum, and either free or confluent; the two lateral inner segments narrow; labellum in front, very large, inflated into a pouch, somewhat resembling a high shoe, without a spur. *Column* short, nodding, lobed above, the lateral lobes each bearing an anther beneath; *anthers* inserted transversely in the under side of the lateral lobes of the column, two-celled, the cells somewhat separated, each bursting by a longitudinal slit; pollen at first granular, then waxy, afterwards almost fluid. *Ovary* inferior, one-celled, not twisted, with many anatropous ovules, arranged on three parietal placentas; columnar *style* somewhat curved forwards, shortly stalk-like below, four-lobed above, the posterior lobe expanded, petaloid or fleshy, overhanging the stigma, the lateral lobes bearing the anthers; *stigma* deltoid, occupying the lower face of the column between the authers and anterior, terminal lobe of the column. *Capsule* one-celled, with three parietal placentas. *Seeds* numerous, minute; *embryo* a minute, acotyledonous cellular body, in a loose cellular testa.

Cypripedium Lowei, *Lindley*. Low's Lady's Slipper.—Bracts not equal to the germen; the two lower segments of the outer circle of the perianth united into a broadly lanceolate, acuminate piece, attenuated below and somewhat incurved, the upper one lanceolate; labellum with a notch in front of the pouch, and a large triangular tooth on each side; lateral segments much longer than the outer, narrowly lanceolate-spathulate and acuminated; leaves long, obtuse, slightly notched at the apex, sheathing at the base.

Synonymy.—Cypripedium Lowei, *Lindley* in *Gard. Chron.*, 1847, p. 765.

Description.—A stemless perennial herb. Leaves broad with somewhat parallel sides, rounded off at the end and slightly notched at the tip, embracing the stem and the base of the succeeding leaf, bright green. Flowers few (8-10 in the wild plant), on a slender, finely glandular scape; bracts lanceolate, acute, embracing the germen, not quite equalling it in length. Perianth large, and variously coloured; the two lower sepals confluent into one broadly lanceolate-acuminate piece, attenuated into a narrower portion below, slightly inflexed above, one and a half inches long, green, with a purplish tinge near the base; upper sepal narrowly lanceolate-acute, coloured like the others. Lateral petals much longer, narrow below, and much broader towards the end, then acuminated; at first spreading, then curved inwards and upwards, three inches long, yellowish green near the base, spotted with purplish brown, purplish rose with yellow margins and midribs in the upper half. Labellum one and a half inches long with the pouch nearly an inch deep, broad and inflated, open above, with a notch in front and a large triangular tooth on each side, separated by a notch from the base, purplish green and shining. All the segments of the perianth somewhat veined.—A. H.

History, &c.—This pretty Lady's Slipper was gathered by Mr. Low, jun., in Borneo, where it was discovered growing on high trees in thick jungle. It was introduced by this gentleman to the nursery of Mr. Low of Clapton about 1846, and was first bloomed in Europe in the garden of A. Kenriek, Esq., of West Bromwich. Our drawing was made in the nursery of Messrs. Rollisson, of Tooting, from a plant which these gentlemen exhibited at the May show of the Horticultural and Royal Botanic Societies.

Culture.—Cypripedium Lowei requires to be grown in the Orchid house. It is of easy culture there, producing its interesting flowers in the spring months. Mr. Brown, foreman at the Tooting Nursery, has communicated an outline of the manner in which the plant from which our figure is taken, was cultivated, and we cannot do better than introduce it here:—"The Cypripedium should be grown in company with such plants as Cœlogynes, Coryanthes, Zygopetalums, Calanthes, &c., in a temperature ranging, by day, from seventy-five to eighty-five degrees, and, at night, from sixty to seventy degrees. In the winter season, from sixty to seventy degrees by day is sufficient. While the plants are growing, the atmosphere must be maintained in a moist state; the plants also require a tolerable supply of water, which should be given with a syringe or a small pot round about the plant, but care must be taken not to water over the foliage, for this would be very likely to cause the plant to rot. In the winter and resting season, water must be applied very sparingly, and the atmosphere must be kept much drier. The plant requires plenty of pot-room, and the pots must be well drained. The compost should be rich in vegetable matter: such as a mixture of one half decomposed sphagnum, and one half of rich fibrous peat soil. The plant comes into flower in spring, and remains from two to three months in bloom, if kept in a warm dry house."—M.

ROYAL BOTANIC SOCIETY'S JUNE EXHIBITION.

ACCUSTOMED to, and intimately connected with, the metropolitan exhibitions, as we have been for a number of years past, we can safely assert, that the exposition in the Inner Circle, Regent's Park, on the 12th instant, was the finest June show we ever beheld; infinitely superior to Chiswick, both in extent and arrangement, and attended by a company many thousands above the Chiswick gathering. Indeed, the fact is fast gaining notoriety, that it is no longer necessary to journey beyond Hammersmith, in order to see a fine exhibition—the monopoly of gay flowers and luscious fruits is broken down, and those who cannot spare the time, or who do not approve of a five miles' dusty ride, are content to bide their time, and see the flowers nearer home. Added to this, the American plants are a source of considerable attraction, and a sight such as the combined exertions of the great growers of Bagshot could alone produce. The tasteful arrangement of the groups, and the multitudinous assemblage of gay flowers, must be seen to be appreciated, indeed, the tent was

"One boundless blush, one bright impurpled
Shower of endless blossoms."

Some of the higher coloured Rhododendrons were past their best, and the early Azaleas were also fading, but many of the Rhododendrons and Kalmias have yet to bloom, so that the plants will be gay for a week or two to come. The principal contributors were the two Waterers, from whose vast collections at Bagshot and Knap Hill, some admirable plants were sent. Messrs. Standish and Noble had also a choice collection, rich in novelties from the Celestial Empire; among which, a dried specimen of the Funebral Cypress, from the Vale of Tombs, was not the least attractive, and it will doubtless prove, apart from its associations, one of the most interesting of modern introductions. Interspersed through the groups were some fine examples of Coniferous plants, as Cedrus, Pinus, Abies, Cryptomeria, Cupressus, &c. &c.; but we would take the liberty of suggesting, that, another season, the appearance of the groups would be much improved, if a few flowering specimens of Laburnum, Judas tree, Scarlet Thorn, and Scarlet Horse Chestnut could be introduced. The colour of the Laburnum is much wanted for contrast, and the Scarlet Horse Chesnut would also be desirable, on the same account. It is also worth consideration, whether, as the exhibition has attained a permanent character, the supports for the tents might not be permanent also, and these, if covered with the finer kinds of climbing plants, as Roses, Wistarias, Aristolochias, &c., would have a fine effect, and do much to destroy the artificial character of the scene; indeed, we see no just reason why all the tents might not be similarly supported, with climbing plants covering the main supports.

Apart from the American plants, the next leading feature of attraction was the Victoria Water Lily, Victoria regia, sent from the garden of the Duke of Northumberland at Syon. Two leaves, each more than five feet in diameter, were produced, and one flower. One of the leaves was floating in a tank of water; but the other was reversed, to show the singular construction of the under portion of the leaf. With the flower were three wax models, showing the flower in three different stages of development, and, though coloured rather too highly, they conveyed a very good idea of this magnificent flower. From the same garden, Mr. Ivison produced a collection of tropical fruits or spices, among which we noticed the Pear of the Gods, Diospyros sapota, the Star Apple, Chrysophyllum Cainito, the Gamboge, Xanthochymus pictorius, the Loquat, Eriobotrya japonica, and though last, not least, the Vanilla, Vanilla planifolia, impregnating the air with its grateful and delicious fragrance.

Fruit formed a part of the exhibition; but, with a few exceptions, it did not do much to sustain the character of British fruit growers. Huge Melons were produced, some of them almost tasteless; and some large, ugly Pines were also there; the whole of the White Grapes were unripe, and many of what should have been Black Grapes had much of the *Hambro rouge* character about them. However, a few worthy exceptions were present, among which the Black Hamburghs, from Apley Park, produced by Mr. Barnes, though injured by travelling, were the best; these were, indeed, first-rate Grapes. Mr. Stent, gardener to A. Herbert, Esq., Clapham, had some fine and well-coloured Black Hamburghs; as had also Mr. Jackson, gardener to H. Beaufoy, Esq.; Mr. Cuthbert, Mr. Chapman, and Mr. Henderson. Pines were not remarkable; large Providences came from Mr. Chapman, gardener to J. B. Gleg, Esq.; and a small but very handsome Queen from Mr. Jones, gardener to Sir John Guest, Bart. Of Peaches, some very fine Noblesse were sent by Mr. Patterson, gardener to the Baroness Wenman; and good fruit was also sent by Mr. Chapman and Mr. Turnbull, gardener to the Duke of Marlborough. Nectarines came from Mr. Chapman, Mr. Foggo, gardener to the Marquis of Abercorn, and Mr. Tillery, of Welbeck; and Mr. Foggo had, as usual, a fine dish of Figs. Of Melons, the best was an hybrid Persian from Mr. Robertson, gardener to Lady E. Foley. Mr. Robson, gardener to the Marquis of Cornwallis, sent Robson's hybrid Cantaloup; and Mr. Munro, gardener

to Mrs. Oddie, had the Egyptian Green Flesh. Some fine British Queen Strawberries were sent by Mr. Harrison, of Oatlands, and Mr. Dunsford; and good Keens' Seedlings by Mr. Harrison and Mr. Monro. Three enormous Cucumbers, called Hunter's Prolific, were also present.

Of Plants the two large collections were contributed by Mrs. Lawrence and Mr. Colyer, whose productions were so equally balanced as to merit, as to give some trouble to the judges to decide to which the palm of victory belonged. However, Mrs. Lawrence's huge back tier specimens prevailed, and justly so, we must confess. Among them, Polygala acuminata was a most remarkable plant, less meritorious, because less difficult to manage, than the Pimelea, represented at page 251; but still a magnificent specimen of unexampled cultivation. The next best specimens, to our thinking, were Chorozema ovata, a lovely thing; Leschenaultia formosa, a huge bush nearly four feet in diameter; two plants of L. biloba major, splendidly flowered; an admirable plant of the very difficult Adenandra fragrans, a fine Pimelea Hendersonii, a pretty Dillwynia floribunda, with two plants of Ixora grandiflora, four nice Azaleas, and some noble examples of Eriostemon, Pimelea decussata, Ericas, and Abelia floribunda, which, as managed at Ealing Park, proves to be an excellent plant. In Mr. Cole's group we noticed an exquisite specimen of Ixora crocata, two of Ixora grandiflora, Dipladenia splendens, and crassinoda; Clerodendron Kæmpferi and paniculatum, with three spikes; Polygala cordifolia, an immense plant; and three Allamandas—grandiflora, cathartica, and Schottii, the latter with flowers five inches and a half in diameter; Sphenotoma gracilis, a nice plant; and a well-coloured Boronia serrulata. In addition to these, we noticed some fine specimens of Aphelexis, with Dillwynia rudis sanguinea, a first-rate plant; Erica tricolor rubra, an excellent specimen; and some fine Pimeleas. In the collections of twenty plants there were several competitors, and some splendid plants were produced. Mr. Green had a noble plant of Allamanda cathartica; Leschenaultia formosa, and Erica depressa, two admirable plants; Gardenia Fortuniana, scenting the whole tent; a fine Ixora, with Sphenotoma gracilis and Azalea decora. Mr. Taylor had a lovely plant of Ixora crocata, Adenandra fragrans, Dipladenia crassinoda, well coloured; Erica Cavendishiana, Phœnocoma prolifera, not quite sufficiently advanced; and Azalea indica exquisita, remarkably well coloured, showing this very distinct variety to considerable advantage. Messrs. Fraser had also a group of twenty plants, among which the Hibbertia Cunninghamii, with its very lively yellow flowers, was the most conspicuous; Epacris grandiflora was also fresh and good; and the same may be said of Azalea præstantissima. Of collections of ten plants, Mr. Croxford, gardener to H. H. Barnes, Esq., had a fine group, containing Phœnocoma prolifera, Gompholobium versicolor, a remarkably fine plant; Epacris miniata, finely coloured; Aphelexis humilis purpurea, very neat; with a good blue Leschenaultia, and a tolerable Ixora. Mr. Carson produced a fine Polygala oppositifolia, the blue and orange Leschenaultias, with a good Sphenotoma, Allamanda cathartica, and a tolerable Ixora. From Mr. Laybank, we noticed a finely bloomed Leschenaultia formosa, Boronia serrulata, with a good Aphelexis, and a neatly-trained and well bloomed Hoya carnosa. Mr. Barnes, gardener to R. Hanbury, Esq., was also a contributor in this class. His best plants were Æschynanthus Boschianus, finely bloomed; Azalea lateritia, Dipladenia splendens very fine; and Ixora grandiflora, with remarkably fine heads of bloom. Collections of ten plants were also contributed by Mr. Malyon, Mr. Stanley, Mr. Bruce, and Mr. Hamp.

ERICA ELEGANS: exhibited by S. Rucker, Esq.

Single specimen plants were not numerous, but doubtless the finest plant was Mr. Cole's Aphelexis spectabilis grandiflora. Mr. Leach, gardener to S. Rucker, Esq., sent a fine Erica Cavendishiana, nicely coloured; Mr. Dennet, Erica intermedia; and Mr. May, Pimelea decussata.

Of the new plants exhibited, there were several possessing considerable interest. In our woodcut are given representations of (1) Roupellia grata, the Cream fruit of tropical Africa, a fine climbing stove shrub, with leathery leaves, and terminal cymes of white funnel-shaped flowers, having a large spreading five-lobed limb, and a coronet of brownish filaments projecting from the throat; (2) Escallonia macrantha, from Chiloe, a new hardy shrub, of great beauty, bearing terminal panicles of pretty rose-coloured blossoms; and (3) Dipladenia urophylla, a branching glabrous stove shrub, with ovate-oblong leaves tapering into a long point, and slender drooping racemes of flowers, of which the tube is funnel-shaped, with a broad mouth, creamy outside, yellow within, bordered with the spreading salmon-pink, five-lobed limb; it is from the Organ Mountains of Brazil. The Roupellia was shown by Mr. Cole, gardener to H. Colyer, Esq.; the Escallonia and Dipladenia were from Messrs. Veitch's nursery, whence also was sent a fine plant of the Mitraria coccinea. The most remarkable other new plants exhibited were—the beautiful dwarf Cereus Leeanus, from Messrs. J. and C. Lee, of Hammersmith, of this we shall soon publish a figure; a species of Bejaria, from Santa Martha, allied to B. Lindeniana, if not identical with it, communicated by Mr. Ivison, and the very distinct and showy Begonia cinnabarina, from Messrs. Henderson, who had also Gloxinia grandis, one of the finest of the crimson throated varieties. Among new Orchids we noticed Odontoglossum hastilabium; and Barkeria melanocaulon, from Mr Barnes. Of plants of economical interest, we noticed Garcinia Mangostana and the Peruvian Bark, from Messrs. Veitch, and Bischoffia javanica from Messrs. Rollisson.

Of Azaleas only one collection was produced, and that came from Mr. Green. It contained plants of Apollo, fulgens, rosea punctata, optima, and variegata.

Two collections of tall Cacti were produced, but they were poor representatives of what the same growers produced years back. Whether it is want of competition or difficulty of carriage that renders these plants scarce we do not know, but it is quite certain they were shown much better seven years back than they are at the present time. The kinds sent were Jenkinsonii and J. grandiflora, speciosissima, Mallesonii, and M. rosea, in Mr. Falconer's lot; and Mr. Green had speciosa, rubra cœrulea, Jenkinsonii, and Ackermanni.

Pot Roses, in good condition for June, were present from Messrs. Lane & Son, Messrs. Paul, and Mr. Francis, and in the amateurs' class, from Mr. Terry, A. Rowland, Esq., and Mr. Roser.

1. ROUPELLIA GRATA. 2. ESCALLONIA MACRANTHA. 3. DIPLADENIA UROPHYLLA.

The flowers were not like those we saw in May, the sunny weather had told upon them, and they looked small, flimsy, and fading. Roses in pots are out of place after May, but we would recommend double the prizes in that month, so as to bring the great growers out with collections of thirty or forty plants each. Roses in pots, to be done well, require good growing, and anything like a check to keep them back, must be injurious to them. If they must be shown in June, let them be confined to certain classes, as the Mosses, Noisettes, or Hybrid Chinas; but Chinas, Teas, and Bourbons, throughout the season, we cannot subscribe to. The collections also want more colour, more diversity of form, in fact *more character*, and this they must have, or lose much of their interest. A few cut Roses were sent, but they were very poor.

The collections of Orchids were less numerous than at Chiswick, but Mr. Mylam, gardener to S. Rucker, Esq., produced some admirable specimens. Foremost among them, in point of skilful management, stood Vanda teres, with a number of its beautiful flowers; Odontoglossum citrosmum, with five spikes of its lovely flowers; Barkeria spectabilis, a small plant with eight spikes; Aërides affine, and a huge plant of A. odoratum majus; Cattleya violacea, and Mossiæ, very lovely; with Anguloa Clowesii, Dendrobium formosum, Phalænopsis grandiflora, and a small neat plant of Camarotis purpurea. A second group came from Mr. Blake, gardener to J. H. Schroder, Esq., among which we noticed the singular Coryanthes macrantha, Vanda tricolor, Phalænopsis grandiflora, Saccolabium guttatum, with Aërides odoratum, crispum and Schroderii, a very deeply marked variety, which we hope shortly to publish a figure of. Collections of Orchids also came from Mr. Williams, Messrs. Rollisson, Mr. Franklin, gardener to Mrs. Lawrence, Mr. Carson, Mr. Beck, and Mr. Barnes, each collection containing some remarkable specimens, the best of which have been enumerated in a preceding page. As a hardy Orchid of considerable interest, we give an engraving of Cypripedium spectabile, produced by Mr. Barnes, and which had nearly thirty of its beautiful flowers. This plant is quite hardy. We saw it blooming in the open ground at Redleaf, only a few days back; but still, as grown by Mr. Barnes, it is an admirable pot plant.

CYPRIPEDIUM SPECTABILE: exhibited by R. Hanbury, Esq.

Cape Heaths, though fine, were not quite up to the average. Mr. Smith, gardener to W. Quilter, Esq., produced a group of noble plants; but the collection sent by Mr. Leach, gardener to S. Rucker, Esq., containing more difficult kinds, was considered more meritorious. In Mr. Leach's lot we noticed E. tricolor rubra, a noble plant; E. elegans, represented in the engraving (p. 299)a little stale, but still an example of matchless cultivation; E. mutabilis, a fine bush, with E. jasminoides, metulæflora, tricolor Wilsonii, and speciosa, ventricosa hirsuta alba, and rosea. Mr. Quilter's plants, as before remarked, were larger, but the kinds less valuable. The collection contained good examples of E. suaveolens, metulæflora, Cavendishiana, ventricosa grandiflora, Bergiana, a large elegans, with Lee's tricolor, and bruniades, more curious than beautiful. Among nurserymen the competitors were Messrs. Rollisson and Mr. Epps of Maidstone. In the former's collection we observed several rare kinds; among others jubata multiflora, jasminiflora alba multiflora, a profuse flowering variety, pregnans superba, ventricosa breviflora, ampullacea nana, and tricolor amabilis. Mr. Epps had fine plants of splendens, propendens, rather past its best, tricolor coronata, called t. dumosa, and tricolor Jacksonii. Of collections of six Heaths the best came from Mr. Dennett, of Clapham, and comprised a fine Cavendishiana, florida very neat, and tricolor Lecana. The best plant in Mr. Green's lot was E. Massoni. Mr. Cole, Mr. Taylor, and Mr. May also contributed small collections. Mr. Epps produced again his tricolor Eppsii, noticed in a former report, and it is certainly the finest of all the varieties of tricolor.

Of Pelargoniums there was a very magnificent display, and some very admirable specimens of cultivation were produced. Mr. Cock was again the leading star, and certainly it would be impossible to conceive anything more perfect than his cultivation. Mr. Black, gardener to E. Forster, Esq., Mr. Robinson, Mr. Staines, Mr. Bragg, of Slough, Mr. Parker, Mr. Beck, and Mr. Gains were the

contributors. The most remarkable kinds were Salamander, Star, Mars, Sikh, Cruenta, Thisbee, Pictum, Corregio, Norah, Marian, Alonza, Victory, Gustavus, Alderman, Lalla Rookh, Constance, Gipsey Bride, Conspicuum, Lamartine, Sun-down, Symmetry, Emily, Emilie, Rosa, Cuyp, Sarah, Mont Blanc, and Crusader. Fancy Pelargoniums came from Mr. Robinson, who had some noble plants, also from Mr. Staines and Mr. Miller, gardener to R. Mosely, Esq.; and, among nurserymen, the contributors were, Mr. Ambrose, Mr. Gains, and Mr. E. G. Henderson. The best kinds were, Bouquet tout fait, Magnifica, Empress, Statueski, Rein de Français, Fairy Queen, Formosa, Picturata, Jenny Lind, Madame Rosatti, Gent Jung, Priam, Albonii, and Amelia.

Several groups of Calceolarias were shown, and some of them in tolerable condition. The best kinds were Incarnata, Mount Beauty, Umbrosa, Coronata, Resplendens, and Lama, from Messrs. Henderson's; Lord of the Isles, from Mr. Franklin, whose plants were well grown; Attraction and Canary, from Mr. Stanley; Eliza and Layton's Blanch, from Mr. Layton; Astarte and Pantha, from Mr. Gains; and Earl of Rosslyn and Catherine Seaton, from Mr. Catleugh.

Cape Pelargoniums came from Mr. Parker, Mr. Staines, and Mr. Stanley. In the miscellaneous class we noticed a fine group of Schizanthus retusus albus, from Messrs. Henderson; a fine collection of Irises, from Mr. Salter, of Hammersmith; Ranunculuses, from Mr. Tyso; Alpine plants, from Mr. Wood, Mr. Turner, and Mr. Smith; and several groups of Ferns were communicated by Mr. Williams and Mr. Smith.—A.

Review, and Miscellaneous Notices.

Footprints of the Creator; or, the Asterolepis of Stromness. By Hugh Miller, author of "*The Old Red Sandstone*," &c. London: Johnstone & Hunter.

One of the objects of this book, as it appears from the dedication, is to controvert those peculiar views on Creation, sometimes called the Lamarckian or Development hypothesis, which were revived in this country not long since, by the ingenious author of the "Vestiges of the Natural History of Creation." That hypothesis is here met by an appeal to science, especially to that branch of science—namely geology—which is more especially to be regarded as the record of the ancient history of our planet. The author of the "Footprints," who is well known as a geologist, while pursuing his favourite study, located himself, as he tells us, in the vicinity of Stromness, in order to investigate the geology of the Orkneys—which possesses much interest owing to the extraordinary development of the Lower Old Red Sandstone, and the abundance of its vertebrate remains. In the course of this investigation, he met with the nail-like fossilized bones of the Asterolepis, the most gigantic, and apparently, from the position of its remains, one of the earliest of the ganoid fishes of the Old Red Sandstone. This fact is made to serve as a starting point, from which, taking up the ichthyolitic evidence of palæontological records, as they are inscribed on the stratified rocks, the inconsistency and baseless character of the Lamarckian theory is exposed. "I know not," writes our author:—

"I know not how it may be with others, but the special phenomena connected with Orkney, which most decidedly bore fruit in my mind, were those exhibited in the neighbourhood of Stromness. I more particularly refer to the characteristic fragment of Asterolepis, which I detected in its lower flag-stones; and to the curiously mixed, semi-marine, semi-lacustrine vegetation of the Loch of Stennis. Both seem to bear very directly on that Development hypothesis—fast spreading among an active and ingenious order of minds, both in Britain and America, and which has been long known on the Continent—that would fain transfer the work of creation from the department of miracle to the province of natural law, and would strike down in the process of removal all the old landmarks, ethical and religious."

The palæontological argument we must pass over. All that our space will allow us to do is to scan briefly what our author says of the Development hypothesis, and its results, and to quote some of the evidence which he adduces against it, from the "Two Floras of the Lake of Stennis."

"Every individual, whatever its species or order, begins and increases until it attains to its state of fullest development, under certain fixed laws, and *in consequence* of their operation. The microscopic monad developes into a fœtus, the fœtus into a child, the child into a man; and however marvellous the process, in none of its stages is there the slightest mixture of miracle—from beginning to end all is progressive development, according to a determinate order of things. Has *nature*, during the vast geologic periods, been pregnant, in like manner, with the human race? and is the species, like the individual an effect of progressive development, induced and regulated by laws? The assertors of the revived hypothesis of Maillet and Lamarck reply in the affirmative. Nor, be it remarked, is their positive atheism in the belief. God might as certainly have *originated* the species by a law of development, as he *maintains* it by a law of development. The existence of a First Great Cause is as perfectly compatible with the one scheme as with the other . . There are, however, beliefs, in no degree less important to the moralist, or the Christian, than even that in the being of a God, which seem wholly incompatible with the development hypothesis. If during a period so vast as to be scarcely expressible by figures, the creatures now human have been rising by *almost* infinitesimals, from compound microscopic cells—minute vital globules within globules, begot by electricity on dead gelatinous matter—until they have at length become the men and women which we see around us, we must hold either the monstrous belief that all the vitalities, whether those of monads or of mites, of fishes or of reptiles, of birds or of beasts, are individually or inherently immortal and undying, or that human souls are *not* so. The difference between the dying and the undying—between the spirit of the brute that goeth downward, and the spirit of man that goeth upward—is not a difference infinitesimally, or even atomically *small*. It possesses all the breadth of eternity to come. . . . And yet, if the *spirit* of a monad, or of a mollusc, be not immortal, then must there either have been a point in the history of the species, at which a dying brute—differing from its offspring merely by an inferiority of development, represented by a few atoms, mayhap, by a single atom—produced an undying man; or, man in his present state, must

be a mere animal, possessed of no immortal soul, and as irresponsible for his actions to the God before whose bar he is, in consequence, never to appear, as his presumed relatives and progenitors, the beasts that perish. Nor will it do to attempt escaping from the difficulty by alleging that God at some certain link in the chain *might* have converted a mortal creature into an immortal existence, by breathing into it a "living soul;" seeing that a renunciation of any such direct influence on the part of Deity in the work of creation, forms the prominent and characteristic feature of the scheme—nay, that it constitutes the very nucleus round which the scheme has originated. And thus, though the development theory* be not atheistic, it is at least practically tantamount to atheism."

The author maintains that, in order to establish the truth of the Development theory, the geological evidence regarding it should run thus:—the earlier fossils ought to be very *small* in size, and very *low* in organization. About a couple of hundred pages of the book furnish a reply to the question, What are the *facts?* in reference to this matter; and negative evidence to a large extent is adduced. But we must turn to the Flora already alluded to.

"I have said that the curiously-mixed, semi-marine, semi-lacustrine flora of the Lake of Stennis became associated in my mind, like the ancient *Asterolepis* of Stromness, with the development hypothesis. The fossil represents not inadequately the geologic evidence on the question; the mixed vegetation of the lake may be regarded as forming a portion of the phytological evidence. 'All life,' says Oken, 'is from the sea. Where the sea organism, by self-elevation, succeeds in attaining into form, there issues forth from it a higher organism. . . . The first organic forms, whether plants or animals, emerged from the shallow parts of the sea.'"

The same views of the origin of terrestrial vegetation are held by Oken and the author of the "Vestiges." They agree in holding that the plants of the land existed in their first condition as weeds of the sea.

"But what does experience say regarding the transmutative conversion of a marine into a terrestrial vegetation—that experience upon which the sceptic founds so much? As I walked along the green edge of the Lake of Stennis, selvaged by the line of detached weeds with which a recent gale had strewed its shores, and marked that for the first few miles the accumulation consisted of marine algæ, here and there mixed with tufts of stunted reeds and rushes, and that, as I receded from the sea, it was the algæ that became stunted and dwarfish, and that the reeds, aquatic grasses, and rushes, grown greatly more bulky in mass, were also more fully developed individually, till at length the marine vegetation disappeared, and the vegetable debris of the shore became purely lacustrine, I asked myself, whether here, if anywhere, a transition flora between lake and sea ought not to be found? For many thousand years, ere the tall grey obelisks of Stennis had been torn from the quarry, or laid down in mystic circle on their flat promontories, had this lake admitted the waters of the sea, and been salt in its lower reaches, and fresh in its higher. And during this protracted period had its quiet well-sheltered bottom been exposed to no disturbing influences through which the delicate process of transmutation could have been marred or arrested. Here then, if in any circumstances, ought we to have had, in the broad permanently brackish reaches, at least indications of a vegetation intermediate in its nature between the monocotyledons of the lake, and the algæ of the sea; and yet not a vestige of such an intermediate vegetation could I find among the up-piled debris of the mixed floras, marine and lacustrine. The lake possesses no such intermediate vegetation. As the water freshens in its middle reaches, the algæ become dwarfish and ill-developed; one species after another ceases to appear, as the habitat becomes wholly unfavourable to it; until at length we find, instead of the brown, rootless, flowerless fucoids and confervæ of the ocean, the green, rooted, flower-bearing flags, rushes, and aquatic grasses of the fresh water. Many thousands of years have failed to originate a single intermediate plant. And such, tested by a singularly extensive experience, is the general evidence." . . .

"While there is thus a vegetation intermediate *in place* between the land and the sea, we find, as if it had been selected purposely to confound the transmutation theory, that it is in no degree intermediate in character. For, while it is chiefly marine weeds of the lower division of the confervæ that creep upwards from the sea to meet the vegetation of the land, it is chiefly terrestrial plants of the higher division of the dicotyledons that creep downwards from the land to meet the vegetation of the sea. The salt-worts, the glass-worts, the arenaria, the thrift, and the scurvy-grass are all dicotyledonous plants. Nature draws a deeply marked line of division where the requirements of the transmutative hypothesis would demand the nicely graduated softness of a shaded one; and, addressing the strongly marked floras on either hand, even more sternly than the waves themselves, demands that to a certain definite bourne should they come, and no further."

"It is *not true* that human observation has not been spread over a period sufficiently extended to furnish the necessary data for testing the development hypothesis. In one special walk—that which bears on the supposed transmutation of algæ into terrestrial plants—human observation *has* been spread over what is strictly analogous to *millions* of years. For extent of space in this matter is exactly correspondent with duration of time. No man, in this late period of the world's history, attains to the age of five hundred years; and as some of our larger English oaks have been known to increase in bulk of trunk and extent of bough for five centuries together, no man can possibly have seen the same huge oak pass, according to Cowper, through its various stages of "treeship"—

> "First a seedling hid in grass;
> Then twig; then sapling; and as century rolls
> Slow after century, a giant bulk
> Of girth enormous, with moss-cushioned roots
> Upheav'd above the soil, and sides embossed
> With prominent wens globose.

"But though no man lives throughout five hundred years of time, he can trace, by passing in some of the English forests through five hundred yards of space, the history of the oak in all its stages of growth, as correctly as if he *did* live throughout the five hundred years. Oaks, in the space of a few hundred yards, may be seen in every stage of growth, from the newly burst acorn, that presents to the light its two fleshy lobes, with the first tender rudiments of a leaflet between, up to the giant of the forest, in the hollow of whose trunk the red deer may shelter. The fact of the development of the oak from the minute two-lobed seedling of a week's growth, up to the gigantic tree of five centuries, is as capable of being demonstrated by observation spread over five hundred yards of space, as by observation spread over five hundred years of time. And be it remembered that the sea-coasts of the world are several hundred thousand miles in extent. Europe is by far the smallest of the earth's four large divisions, and it is bounded, in proportion to its size, by a greater extent of land than any of the others. And yet the sea-coasts of Europe alone, including those of its islands, exceed twenty-five thousand miles. We have results before us, in this extent of space, identical with those of many hundred thousand years of time; and if terrestrial plants were as certainly developments of the low plants of the sea, as the huge oak is a development of the immature seedling just sprung from the acorn, so vast a stretch of sea-coast could not fail to present us with the intermediate vegetation in all its stages. But the sea-coasts fail to exhibit even a vestige of the intermediate vegetation. Experience, spread over an extent of space analogous to millions of years of time, does not furnish, in this department, a single fact corroborative of the development theory, but, on the contrary, many hundreds of facts that bear directly against it."

We cannot, in these fragmentary extracts, convey a complete view of Mr. Miller's arguments, for which the book must be consulted. Our quotations, however,

* The Continental assertors of the development hypothesis are greatly more frank than those of our own country regarding the "life after death," and what man has to expect from it. The individual, they tell us, perishes for ever; but then out of his remains there spring up other vitalities.

give a general notion of the purpose of the book, and of the very interesting way in which it is worked out. Another passage must suffice :—

"In Scripture, the formation of the human race is described as the terminal act of a series, 'good' in all its previous stages, but which became 'very good' then. . . Nature lay dead in a waste theatre of rock, vapour, and sea, in which the insensate laws, chemical, mechanical, and electric, carried on their blind unintelligent processes: the *creative fiat* went forth; and, amid waters that straightway teemed with life in its lower forms, vegetable and animal, the dynasty of the fish was introduced. Many ages passed, during which there took place no further elevation; on the contrary, in not a few of the newly introduced species of the reigning class, there occurred for the first time examples of an asymmetrical misplacement of parts, and, in at least one family of fishes, instances of defect of parts; there was the manifestation of a downward tendency, toward the degredation of monstrosity, when the elevatory fiat again went forth, and *through an act of creation* the dynasty of the reptile began. Again many ages passed by, marked apparently by the introduction of a warm-blooded oviparous animal, the bird, and of a few marsupial quadrupeds, but in which the prevailing class reigned undeposed, though at least unelevated. Yet again, however, the elevatory fiat went forth, and *through an act of creation* the dynasty of the mammiferous quadrupeds began. And after the further lapse of ages, the elevatory fiat went forth yet once more, *in an act of creation*, and with the human, heaven-aspiring dynasty, the moral government of God, in its connection with at least the world which we inhabit, 'took beginning,' and then creation ceased. Why? Simply because God's moral government *had* begun—because, in necessary conformity with the institution of that government, there was to be a thorough identity maintained between the glorified and immortal beings of the terminal dynasty, and the dying magnates of the dynasty which now is; and because, in consequence of the maintenance of this identity as an essential condition of this moral government, mere *acts of creation* could no longer carry on the elevatory process. The work analogous in its end and object to those *acts of creation* which gave to our planet its successive dynasties of higher and yet higher existencies, is the work of REDEMPTION. It is the elevatory process of the present time—the only possible provision for that final act of *re*-creation to 'everlasting life' which shall usher in the terminal dynasty."

We strongly recommend Mr. Miller's "*Footprints*" to be put into the hands of the young and inexperienced as a safeguard or antidote against the baneful influence of the "Vestigean theory." It is throughout nicely written, and as nicely got up. The illustrations, chiefly palæontological, but including also some fucoids, ferns, and lignites, are numerously interspersed.—M.

Hybrid Epimediums.—In the *Ghent Annals*, (v., t. 243), Professor Morren has published figures of three very interesting Epimediums, which are stated to be of hybrid origin: they are called violaceo-diphyllum, versicolor, and sulphureum. It is stated on the authority of M. Spae, that violaceo-diphyllum, is a hybrid obtained from crossing two plants belonging to different genera. One of these, the Aceranthus diphyllus, it is impossible to refer to the genus of the Epimeds, for it has no cup-shaped nectaries, but simple smooth petal-like organs. This Aceranthus diphyllus impregnated by the real Epimedium violaceum has produced the violaceo-diphyllum, which M. Donckelaar sen. has figured in the catalogue of the Botanic Garden of Ghent, as Epimedium lilacinum. M. Spae observes that the plant bears the leaves of the Aceranthus and the flowers of the Epimedium; so that the branching portion of the plant is from the female side, and the flower from the male side. M. Morren, however, considers that the leaves of the Aceranthus are distinguishable from the latter by a more decided obliqueness, the margins less dentated, the under lobes being somewhat angular, each terminated by a tooth, while the new kind has the cordate form, the rounded lobes, the numerous teeth at the margins, as in the leaves of the true Epimeds, and the only resemblance to the leaves of the Aceranthus, is confined to their geminate form. There is nothing in the flowers which has any resemblance to Aceranthus. They are furnished with true cucullate nectaries, the spur is extended in a point, the petals are smooth, large, extending a little beyond the nectary, and the colour is that of the Epimedium violaceum. If the hybridation were not affirmed with so much certainty, it might have been considered a simple variety of Epimedium violaceum, with geminate leaves. Whether a hybrid or a variety, it is a very pretty plant as a horticultural subject. The leaves are delicate, and it flowers in spring; the flowers are of a tender lilac colour tinged with white and violet. M. Spae states that the Epimedium versicolor, and E. sulphureum are varieties of E. macranthum. The former flowers much more early than E. (hybridum) violaceum or E. sulphureum. The flowers of the E. versicolor and sulphureum show a great shortening of the spurs, which terminate in small heads or globules, and a proportionate development in the breadth of the petals. E. versicolor is dintinguished by its deep yellow colour, with the spurs and margins of the petals tinged with rose. The flowers of E. sulphureum are entirely yellow. The variety versicolor, as represented by M. Morren is a very beautiful plant. M. Donckelaar, of Ghent, who is distinguished for the culture of the Epimediums, grows them in peaty soil, in a shady and moist situation. They may be propagated by division of the roots, in autumn.

Beurre Capiaumont Van Mons Pear.—This variety is of vigorous habit, with a pyramidal form. The leaves are large, entire, or faintly dentated. The fruit is pyriform and elongate, measuring from four to four inches and a half from the eye to the stalk. In form it is oblique at the summit, where the calyx or umbilicule is situated in a shallow cavity. The stalk is thick, woody, and inserted into a shallow cavity. The skin is somewhat rough, yellowish-brown, considerably deeper at the exposed side, freely sprinkled with small verrucose dots. The flesh is white, delicate, and crisp, very juicy, sweet, and of agreeable flavour. This variety must not be confounded with the old Beurre Capiaumont Aurore. The colour of the fruit is the same in both varieties, but in the Beurre Capiaumont Aurore, the fruit is smaller, its peduncle shorter and thicker, and not inserted so deeply as in the present variety. The difference in habit is more striking; the Capiaumont Aurore is less vigorous, with shorter and thinner branches, its leaves regularly and finely dentated; both come near Beurre Bosc, which differs from them by its peduncle being much longer. There is little difference in the quality, but the Beurre Bosc ripens nearly a fortnight later than the Capiaumont. It was raised by M. Dupuy-Jamain.—*Revue Horticole.*

D.T. Klaverberg del. & lith.

Printed by C.F. Stuffins Senior

Tulip.— Dr Horner

TULIP: DR. HORNER.

Nat. Ord., Liliaceæ.

Generic Character.—Tulipa, *Tournefort*. *Perianth* petaloid, deciduous, six-leaved; sepals and petals campanulate-connivent, subequal. *Stamens* six, hypogynous. *Ovary* three-celled; *ovules* numerous in each cell, in two rows, anatropous; *stigma* terminal, sessile, three-lobed, lobes spreading, complicate. *Capsule* three-sided, three-celled, loculicidally three-valved.—(*Endlicher, Gen. Plant*, 1091.)

Tulipa Gesneriana, *Linn.* Gesner's Tulip.—Stalk one-flowered; leaves ovate-lanceolate, glaucous; petals and sepals obtuse, and, like the filaments, glabrous; flower erect; stigma deeply divided, the lobes decurrent.—*Smith.*

Variety.—Dr. Horner. A light feathered bizarre, with a slender beam down the centre of the petals, of good properties, and pure in colour.

Description.—A showy variety, well shaped, with distinct, clear markings,—feather and beam; raised by Mr. Groom, florist, of Clapham Rise, near London.

History, &c.—Gesner's Tulip, the parent of our ordinary garden varieties, is stated by Kunth to be a native of Asia Minor, the Caucasus, Calabria, and central Italy. Miller states that it was introduced into Europe from the East. Conrad Gesner first made it known by a description and figure. In his additions to Cordus, he states that he first saw it in April, 1559, in a garden at Augsburg. The seeds were brought from Constantinople, or, according to others, from Cappadocia. Balbinus asserts that Busbequius brought the first Tulip roots to Prague, whence they were spread all over Germany. Busbequius himself, in a letter written in 1554, states that this flower was then new to him. The Tulip is said to have been first cultivated in England by Mr. James Garret, an Apothecary, in 1577. Reference is made to him in *Gerarde's Herbal*, published in 1597; and Gerarde states that he received it from Aleppo. This era is confirmed by a note by Richard Hakluyt, who writes in 1582, "now within these four years there have been brought in England, from Vienna in Austria, divers kinds of flowers called Tulipas.

The "Tulipomania," which arose about the middle of the seventeenth century, is well-known; the roots rose to a value above that of the precious metals. The trade was chiefly carried on in the Netherlands, and rose to its height in 1634, and the three following years. It is said that for a root of a variety called the *Viceroy*, articles to the value of 2500 florins were agreed to be delivered; the *Semper Augustus* was often sold for 3000 florins, and one person agreed to give 4600 florins, with a new carriage, two horses, and complete harness; and another to give twelve acres of land for a single root. The trade was a form of gambling, like the Mississippi and South Sea schemes.—A. H.

THE CULTURE AND PROPERTIES OF THE TULIP.

By Mr. G. GLENNY, F.H.S.

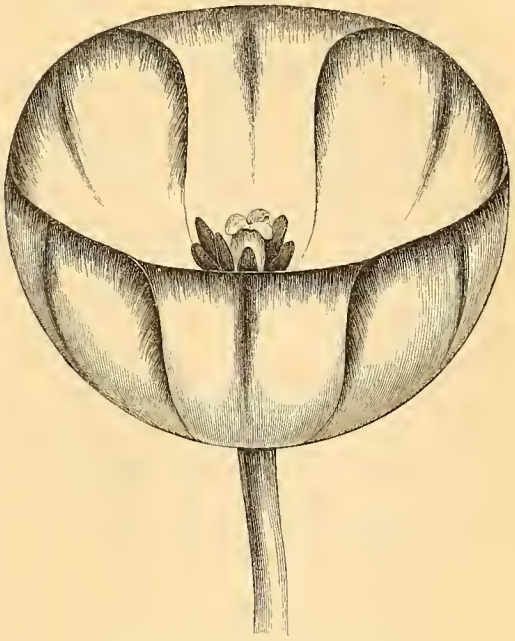
THE Tulip has for more than a century been largely cultivated in Holland and England, many thousands have been raised from seed, and the result has been the acquisition of many very superb varieties, bearing large prices from their scarcity. Even in our own days, we have seen one called Fanny Kemble, another called Polyphemus, a third called Everard, sold at such prices that four or five bulbs have brought a hundred guineas. There is a singularity in Tulips which belongs to no other flower. The seedlings, generally, when they first bloom, produce flowers without any stripes or markings; a yellow or white bottom, and all the upright portion of the petals self-coloured, brown, red, purple, scarlet, or rose, and in this state they have been grown for years without any variegations; they are then called breeders, with what propriety or for what reason we are not aware. These breeders are planted every year until they break into stripes, and if they prove desirable they are named; but they are so many years, sometimes, before this occurs, that they may have multiplied greatly in the breeder state, and, as many sales of breeders take place, they may have been distributed in all directions. Each person who has broken one thinks he has a right to name it, without considering whether it has been broken and named by others, so that we have many in cultivation under very different names, but which are one and the same thing. There is another peculiarity which hardly belongs to any another flower; we allude to the great uncertainty of their markings; for, although we may have twenty of one kind in a bed, scarcely two will come even nearly alike, although good judges can find enough in them to recognise them in any state. Perhaps this uncertainty gives more than half the charm to Tulip cultivation; those which are the most certain in their markings or pencillings of colour

are the most valued; nevertheless, Tulips propagate fast, and a flower worth twenty guineas while there are but half a-dozen in the world, becomes naturally eheaper as it beeomes more plentiful. Florists, however, have, for many years previously to 1832, been sadly at a loss to know what eonstituted a good Tulip. Those who pretended to lay down the criterion of a good flower, went into very silly details, without any fixed principle to guide them, and this naturally led astray those who selected new varieties from their seedlings; they placed an artificial value on things searcely worth cultivating, and they passed over, as useless, others with good general points.

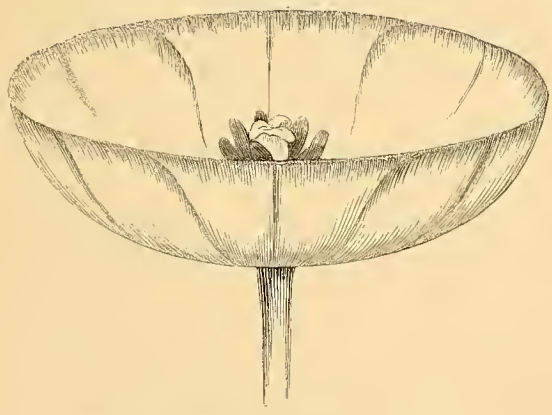
The properties of the Tulip, as explained by the old florists, were a mere tissue of contradictions and conflicting opinions, as we have shown before; and if we are told we were not first to lay down "the properties of the Tulip," we were, at all events, the first to lay them down in such a manner that people could understand them—the first to found them on distinct principles. We begin with form which we take to be the most essential in all improvements of flowers; we have not had two or three favourite flowers before us, and endeavoured to mix up different qualities; we know that a certain model would be perfect, if it could be attained, and we set up our standard from that, simply contending that those which can come nearest, are the best. We say the form of the Tulip should be from one-third to one-half of a hollow ball, with the edge level, the petals setting close to look like one; that the markings of all six petals should be alike. Strange as it may seem, other florists took the hint, and could write on the beauties of a spherical cup, some wanting a little more than half, others wanting the ends of the petals rounding, "because it is the nature of the flowers;" but until we set down the form at one-third to one-half of a hollow ball, people had to guess as to the proper form of a cup. However, as we shall conclude with the properties as we laid them down in 1832, and defended them at public meetings against the fanciful old florists, we shall here proceed to the culture.

The perfection of soil for the culture of Tulips, would be the top three inches of a rich loamy pasture, with the turf in it laid up to rot, and cleared of the wire-worm, grub, and other insects, by repeated turnings and picking. The vegetable matter in it will be sufficient nourishment, without any other dressing. Select a spot for the bed, which should run north and south; complete drainage is essential, but no quantity of rubbish, stones, or other material at the bottom, is of itself of the slightest advantage. It has been the practice with many florists to dig out a bed three or four feet deep, put ten or twelve inches of brick rubbish at the bottom, and to fancy that this drained the bed effectually, whereas, if the drainage water be not got rid of from the garden altogether, this open stuff forms a receptacle for water that drains into it, and does more harm than good. We once saw this operation going on in a spirited florist's garden, and as his men were about throwing in the stuff in which the bulbs were to be planted, we prevailed upon them to leave the filling till the morning, for we fancied we knew the nature of the soil; the next morning exhibited the water over the brick rubbish, and the owner for the first time in his life saw that draining of this kind was not quite the same as draining in a pot, because there was no hole for the water to run away through. He did then what every body ought to do before attempting the cultivation of florist's flowers—drain the whole ground effectually. The bed may be dug out four feet wide, and two feet six inches deep, and be filled up with the soil intended for their growth. This may settle a few days, and be raked level to three inches above the path; on this level the Tulips should be placed, and pressed in a little, then put soil on to three inches above the crowns of the bulbs, and, by raising the bed a little in the centre, the middle row will be covered four or five inches. Tulips are planted six inches apart, seven reaching across the the bed, and any length required. The habit of growth settles the plan for planting; those which grow fifteen to eighteen inches high occupy the outside rows, and the second from both sides; those which grow two feet to two feet six inches should be in the third and centre rows. When the bed is planted and covered, they may be left to the weather until they peep through the ground. Frost will not kill a Tulip, but it will often check and partly blight a bloom, cause the colours to flush, the edges to be notched, and to be otherwise damaged, so that they should be covered at night and against frost, but not longer than is necessary, because covering draws them up weakly. The more air they have, the better they are. In February they will be through the ground, which should be stirred, and have the lumps broken, and laid close round all the stems. When the spikes begin to open, they form a receptacle for the wet, and must not, on any account, be reached by frost. When they show their colours, a top-cloth must be provided, to be let down, that the sun may not reach them, but even this must be watched, that no more air may be kept off than necessary. The cloth must only be let down enough to shade them, and a portion of one side is generally enough for this, and when there is no sun, on no account deprive them of light or air. They would all be stronger and better coloured if they were not shaded at all, but the bloom would be soon over, and sometimes a day's hot sun would totally spoil them; whereas, by shading, a bed may be kept interesting for three

or four weeks. As soon as the flowers fade, shade them no longer, let them have all the air, and all the rain. Those who grow Tulips in perfection, have a regular Tulip-house, with canvas blinds to open and shut on the sides, and rolling cloths to let down, when required, to form the roof; and the same house does for Carnations, and Picotees in bloom, and for greenhouse plants, when they would otherwise be turned out; for the advantage of careful occasional shading, in the middle hours of hot weather, can hardly be over-rated. By the end of June, the stems of the Tulips, will have turned brown or yellow, and, as soon as the leaves begin to decay, the bulbs may be taken up. A series of drawers, with seven partitions in width, enable us to take them up as they are planted, and they are ready for planting again. The best time for planting, is the last half of October, and the first half of November. Tulip seed may be sown either in autumn or spring, in the same kind of soil; it should be saved from the best flowers, grown by themselves in a part of the garden where there are no worse ones to hurt the seed. Many growers affect to cross the Tulip, but if half a dozen of those which have striking qualities, be placed by themselves, and pretty close, nature will aid the sporting, and effect combinations of which we never think. Through the summer months the bulbs must be kept in their boxes in a dry, cool place, where frost cannot touch them; they are best in a dwelling-house. The small offsets should be planted alone, with their labels, that they may be known, but they should be grown in similar soil to the main bulbs. Breeders, which we have already described as seedlings not broken into colour, may be grown in any soil; many florists think changes will cause them to break sooner into colours, but there are no means of hastening this, though various secrets have been sold, and numerous growers have fancied particular nostrums. It has been said that poor soil hastened it; but this is all nonsense, a bed of breeders may yield no changes for years, and then, all at once, the greater portion will break; some affect to find the cause, but it amounts to nothing. The very best cultivators in the kingdom confess, as we do ours, their entire ignorance of any means that will hasten the breaking of breeders. The portrait, which precedes this paper, is that of a Tulip broken by Mr. Groom of Clapham, from a seedling of his own raising, and though some growers fancy it like one thing, and others liken it to something else, we see no particular likeness of anything we have at present, and take it to be a new and a good Bizarre. Seedlings only require to be taken up every year from the first, to the time they bloom, and they are then treated like other Tulips, as to the time of taking up, and the time and distance of planting. As soon as they flower, then root out every one which has a stained bottom, or pointed petals, or that are thin and flimsy. The following are the "Properties," as quoted from the volume published under that title:—



Extreme depth—one-half of a hollow ball.



Extreme shallowness—one-third of a hollow ball.

"1. The cup should form, when quite expanded, from half to a third of a hollow ball. To do this, the petals

must be six in number; broad at the ends, smooth at the edges, and the divisions between the petals scarcely to show an indenture.

"2. The three inner petals should set close to the three outer ones, and the whole be broad enough to allow of the fullest expansion without quartering (as it is called), that is, exhibiting any vacancy between the petals.

"3. The petals should be thick, smooth, and stiff, and keep their form well.

"4. The ground should be clear, and distinct, whether white or yellow. The least stain, even at the lower end of the petal, would render a Tulip comparatively valueless.

"5. Roses, Byblomens, and Bizarres, are the three classes into which Tulips are now divided. The first have a white ground, and crimson, or pink, or scarlet marks; the second have white grounds, and purple, lilac, or black marks; and the last have yellow grounds, with any coloured marks.

"6. Whatever be the disposition of colours or marks upon a Tulip, all the six petals should be marked alike, and be therefore perfectly uniform.

"7. The feathered flowers should have an even, close feathering all round, and whether narrow or wide, light or heavy, should reach far enough round the petals to form, when they are expanded, an unbroken edging all round.

"8. If the flowers have any marking besides the feathering at the edge, it should be a beam, or bold mark down the centre, but not to reach the bottom, or near the bottom of the cup; the mark or beam must be similar in all the six petals.

"9. Flowers not feathered, and with flame only, must have no marks on the edges of the flowers. None of the colour must break through to the edge. The colour may be disposed in any form, so that it be perfectly uniform in all the petals, and does not go too near the bottom.

"10. The colour, whatever it be, must be dense and decided. Whether it be delicate and light, or bright, or dark, it must be distinct in its outline, and not shaded, or flushed, or broken.

"11. The height should be eighteen to thirty-six inches; the former is right for the outside row in a bed, and the latter is right for the highest row.

"12. The purity of the white, and the brightness of the yellow, should be permanent, that is to say, should stand until the petals actually fall."

THE CULTIVATION OF THE HOLLYHOCK.

By Mr. H. M'MILLAN, Westerham, Kent.

AS these noble things are beginning to take their proper place in gardens, I think it might be useful to some of your readers to know how I have grown them with complete success. As soon as the first flower or two opens, of those that I wish to have more of, I take off any side branches there may be that have two or three joints with leaves and no flower buds. I then cut the shoot clean through close under the joint at the bottom of the shoot, leaving the leaf on the shoot entire; then cut it off about two inches above the joint. The second, and sometimes the third joints will do; in fact all that have the appearance of growing eyes are suitable for cuttings, and thus each bud forms a cutting—its base being the bud and joint, with an inch or two of the internode above it to support the bud until roots are formed. The cuttings should be put in under a handglass in any light sandy soil, and they merely want attending to with water, shading, and picking off dead leaves. When rooted I pot them into small sixty pots, and place them in a cold frame, where they remain during the winter. In spring they are planted in the open ground where they are to flower. Of course all the sorts are numbered, and the number, colour, habit, &c., entered in a book, so that in planting, the colours can be arranged to produce the best effect.

The old plants in autumn generally make more herbaceous cuttings than are wanted for next season's flower stems; these, if taken off close to the old stem, and put in under a handglass, make excellent plants. The handglass of course must be placed in a warm sunny situation: the border in front of a south wall is as good a place as any. In very severe weather during the winter a little covering over the glass is necessary.

[It is a fact we believe not generally known that Hollyhocks may be propagated by cuttings of the flower stems, if the stems are not too much exhausted by the flowers before the cuttings are put in. Thus, when the flowers are becoming shabby, cut the plants down; and, commencing at the bottom joints, continue to make cuttings on the plan recommended by Mr. M'Millan, until the wood is too soft for that purpose. These should be put in under a frame or handglass, on a very *slight* heat, the soil being gritty sand, loam, and leaf mould in equal proportions. Water very cautiously, but sprinkle the cuttings lightly every day if the weather is fine. The plants are developed out of the accumulation of adventitious matter and buds formed at the base of each cutting.—A].

ON BLOOMING THE CLOTH OF GOLD, OR CHROMATELLA ROSE.

By Mr. J. SAUL, Durdham Down Nursery, Bristol.

ON the introduction of this beautiful Rose to this country a few years back, Rose fanciers expected to find one of the finest, if not the very finest of yellow Roses; nor have they been disappointed, for when well and finely bloomed it stands unrivalled as a yellow Rose. It has been disseminated since its introduction very extensively; yet few, comparatively few, have succeeded in blooming it well and freely. From what cause is this failure? I think, if we examine minutely the nature of the plant, the manner in which it is generally recommended to be grown, and which is as frequently acted up to, we shall, to a great extent, see the cause of failure, and approach more closely to a system by which the flowering of this splendid Rose shall take place with some degree of certainty. I think it was in the *Gardeners' Chronicle* (but I quote from memory) a correspondent lately inquired the best way of managing it, and was answered by directions to grow it in rather poor soil, as it is a strong grower. Now this I consider very questionable advice, yet I know it is what is generally given. It is classed in that group of Roses called Noisettes, a class which a recent writer called, with much propriety, a "jumble of hybrids;" and certainly many varieties in the group are as distinct as if they were placed in separate classes, being crossed and raised from very dissimilar groups. Taking the Old Noisette, as the type of the class, a large section called Tea-scented Noisettes will be found to differ from it and its congeners very materially, from their affinity with the Tea-scented, being raised from the latter class; to this section belongs the Cloth of Gold, Solfaterre, Clara Wendel, Lamarque, Triomphe de la Duchêne, and many other very fine Roses. The second named, Solfaterre, is very little inferior to the Cloth of Gold, and was raised from the same parents. All this latter section require peculiar treatment, approaching, in some degree, to what we give the strong growing Tea-scented kinds; whilst the former section of Noisettes will grow and flower with freedom, rambling over walls or trellis-work, and in any soil tolerably rich.

Let us examine the mode of growth of Tea-scented and also China Roses, and we shall see they differ very much from others. Nearly all the strong growing summer and climbing Roses, including one section of Noisettes, when they grow freely and produce strong luxuriant shoots, bloom indifferently; indeed, these strong shoots we are speaking of, seldom or never produce flowers; not so with the Tea-scented and Chinas: the strong shoots bring forth invariably the finest blooms. Who has not noticed this with the common China on the cottage wall? I have known gardeners, who have bedded out crimson and other China Roses, cut them down to the surface of the ground every spring, with the best result, as the plants grew freely, and bloomed finely afterwards. Again, all the Tea-scented and Chinas, which are budded during the summer and autumn, will, the following season after being headed-back, produce strong shoots terminated with beautiful heads of bloom. The finest blooms I have ever seen of Devoniensis, Adam, Bougere, and other fine Teas, have been grown in this way as well as the best Cloth of Gold, Solfaterre, and other Tea Noisettes. This all goes to show that the latter, together with Tea-scented, Chinas, &c., should be grown strong, free, and vigorous, in order to produce fine bloom. Indeed, under the starving system, many of these roses will scarcely bloom at all, and when they do, so poor and worthless are the flowers, as, in many instances, not to be recognised as to what variety they belong to. Take, for instance, a Tea-scented or China Rose in spring, let it remain in the pot which it stood in during the previous winter, "not shifting," but giving a little pure water as it requires it, when summer and autumn come, what shall we have? A plant; true, but a wretched one, sickly in appearance, with a few miserable, pale, semi-double flowers! How different from the bright rich colour, large size, fulness, and substance of petal which we find in the well grown plant. Let us now take the same plant in spring: if the head is large cut it freely, give it a liberal shift into good rich compost, and water freely through summer with liquid manure, and what will be the result? Handsome, vigorous plants, with large, rich, clear-coloured flowers produced in profusion.

We have been viewing the Tea-scented and Chinas growing under the starving system, and under better culture. Turn now to the Cloth of Gold, and its congeners, and we shall find the remarks I have been making as applicable in this case as in that. Under the starving system I have seen Cloth of Gold so semi-double, small, and worthless, that had I not been positive of its correctness, I should have questioned its identity; it is also very shy in blooming under this system; I have seen large plants which cover a considerable space of wall, stand year after year without producing a solitary bloom. Why was this so? The plants (like the Tea-scented and China Roses we have been speaking of) not growing strong and freely, having expended all their strength in covering the wall, grow slowly, producing no flowers, but the same sickly, stunted appearance which the Teas and Chinas do. I have

already remarked having seen magnificent blooms of Cloth of Gold, produced from buds of the previous season, if budded on strong stocks, such as Celine, Manettii, &c. These buds, the first season after being headed back, when they commence growing, and are from fifteen to eighteen inches in length, should they not show symptoms of bloom, ought to have their extreme points pinched out, and the laterals will generally bloom fine in the autumn. On the common Dog Rose growing standard and half standard high, I have bloomed it freely in the same way, not that I recommend it for a standard, indeed, I consider it unsuited for the purpose; but should a grower wish to try it in that way, he should protect the head from extreme cold in winter, pruning hard in spring, and supply liberally with liquid manure during the spring and summer to induce free vigorous growth; all strong shoots, on attaining fifteen to eighteen inches in length, must have their points picked off, and the laterals will in general bloom. I have also known them (the strong young shoots) bloom finely when stopped at from nine to twelve inches in length.

To grow it well and bloom it finely, procure a strong healthy plant worked upon a Celine or Manettii stock in spring; plant it out against a south wall, having the border well prepared. If the soil is naturally good, it will be sufficient to well enrich it with good rotten dung, having the border previously well drained; but should the natural soil be bad, it had better be removed, filling up with rich turfy loam and dung, drained well as before. In this it will grow vigorously, and should be assisted during summer every ten days or a fortnight, with a good soaking of liquid manure; as growth proceeds nail closely to the wall, and stop all strong shoots at distances varying from twelve to eighteen inches. Many, both of the stopped and unstopped shoots, will bloom freely. In cold situations it would be as well to give a slight protection in very cold weather during winter. The spring pruning should not take place until late, say the end of March, when all danger from very severe frosts is past; prune hard, cutting well out, and shortening back considerably the old wood, to induce free vigorous growth. Give the same attention the following season as to stopping, watering with liquid manure, &c. The south wall will be found of great importance in ripening the wood well during summer and autumn, which will enable it to resist the winter's cold.

When grown as a pot Rose, it should not be allowed to get overcrowded with wood; in spring thin and shorten the branches well, tying a portion down to the rim of the pot, grow vigorously, and all strong shoots should be stopped at from nine to twelve inches, and neatly tied down into their proper place; give liquid manure as required. In this way it may be bloomed pretty well, though not so freely as against a south wall, which is the best situation in which this Rose can be grown.

NEW FRENCH CHRYSANTHEMUMS.

AMONG twenty-five large-flowered varieties of Chrysanthemums, which were raised by M. Bonamy, of Toulouse, only seven are worthy of particular notice. These are thus described by M.M. Pèle and Neumann, in the *Annales de la Société Centrale Horticulture de France*:—

Jenny Castan.—Flowers very double, light rose colour; petals cuneiform, a little curved inwards; no stamens at the centre; about two inches in diameter.

Remus.—Flowers very double, crimson; petals reflexed, somewhat open at the centre, which is of a rich golden yellow; nearly two inches in diameter.

Bélisaire.—Flowers large and handsome, of a gold yellow; petals very broad, reflexed at the circumference, cuneiform at the centre, and compact; two inches and a half in diameter.

La Fortune.—Flowers of a beautiful golden yellow, very double; petals keeled, deep at the middle, and bordered with yellow. This is a very free flowerer, and of a fine habit; about two inches in diameter.

Belle Paule.—Flowers in compact clusters, of a fine lilac colour; petals very narrow, curved inwards, cuneiform; few or no stamens at the centre; fully two inches in diameter.

Quasimodo.—Flowers white and purple in the petals, which are reduced almost to slender threads, curved inwards, cuneiform; few or no stamens at the centre; rather over an inch in diameter.

Virginie.—Flowers snowy white, without any shading; petals broad, cuneiform, a little reflexed inward at the centre; few or no stamens; of good form; fully two inches and a half in diameter.

Small-flowered Chrysanthemums.

Omnium minima.—A very small variety, with the flowers in the form of a marble, of a delicate rose colour; almost without stamens at the centre; about half an inch broad.

Daphnis.—A beautiful deep violet, resembling an Aster in form; the centre is furnished with close and straight petals, which are turned up at the margins, and resemble slender quills; the rest of the flower is open, and well formed; fully an inch in diameter.

Le Feu Follet.—Flowers of a beautiful crimson; petals cuneiform, tinged with yellow near the base, having few stamens; fully an inch in diameter. This is very richly coloured.

Mignonette.—Flowers very double, of a lilac colour; petals reflexed, almost imbricated; the centre of the flower presents a deep cavity by the petals being close and numerous; nearly half an inch in diameter.

Le Pygmée.—The colour is yellowish, somewhat resembling Gnaphalium bracteatum; petals reflexed, a little cuneiform, having a cavity at the centre; no stamens; about half an inch broad.

Cora.—Colour silvery; petals very broad at the circumference, diminishing towards the centre in length and breadth, inclining to purple; fully half an inch in diameter.

Picciolina.—Of a rosy white colour under the petals, which are very broad at the circumference, somewhat rounded, reflexed; few or no stamens, very regular in form; fully three-quarters of an inch in diameter.

Cupidon.—Colour, a light crimson; petals much pressed against one another; no stamens at the centre; an inch in diameter.

Mignardise.—Very small flowers, of a light lilac colour, arranged in a Ranunculus form; a very free flowerer; no stamens; three quarters of an inch broad.

Venusta.—Flowers rather well formed, of deep lilac colour; petals bifurcate, from five to six series, nearly purple below, and lilac above. This has the appearance of a China Aster; florets very distinct, and more numerous than the petals; fully an inch in diameter.

Nini.—Small in comparison with some of the others, with crimson flowers; the petals and florets are of the same colour, sometimes they are slightly tinged with yellow, flowers straight (upright); fully an inch in diameter.

La Ruche.—This variety has long peduncles; flowers of a clear lilac colour, having two ranges of very long and broad petals; the florets at the disk are of lilac, much larger than in the other varieties; has some resemblance to the Anemone japonica; about an inch and a quarter broad.

Pomponnette.—A very pretty variety, with light lilac-coloured petals, which are somewhat spreading, acute, and only five or six series; the florets form an ovoid sphere, and are whitish; the stamens yellowish, merging to the lilac as they become older; a free flowerer; about an inch in diameter.

Myrtille.—This is of the yellow colour of Gnaphalium bracteatum, having four series of petals at the circumference; the centre is full of florets, forming a round disk of a yellowish colour; the largest flowers are fully an inch in diameter.

[These small flowered varieties may be classed among the most beautiful of our autumnal plants. They originated from the Chusan Daisy, a small variety introduced from China by Mr. Fortune. Most of the kinds are dwarf in habit, so that with their small flowers they form very compact and handsome plants.]

THE PINK AS A POT PLANT.

By Mr. G. GLENNY, F.H.S.

NOTHING is more common than the cultivation of Carnations and Picotees in pots, and why the Pink should not be equally popular as a pot plant we cannot tell. Custom has adopted the most incommodious and ineffective plan imaginable, namely, the formation of beds, so that all the labour required for their proper growth and bloom is necessarily given in the most uncomfortable position, that of stooping to the ground. Now there is not one single point that should lead to pot-culture with the Carnation, that is not equally strong with the Pink; while there is one which is much more forcible in behalf of the Pink, namely, its dwarfness, as compared to the Carnation, which renders the stooping much more fatiguing. The Pink requires that its buds should be tied up, to prevent them from bursting, and it is no small labour, to those ever so much accustomed to it, to go over a bed half a dozen times, to tie such as are ready; whereas, if they were in pots, they could be taken up and tied on a table, without in the least inconveniencing the operator. We have heard it said, that the colours will not come so fine in pots as they do in the ground. This we can positively contradict from experience; and we know that a collection is, on many accounts, safer in pots, than in the open ground, being freer from vermin, if properly attended to, cleaner in their growth, and yielding quite as much healthy grass for propagation.

The pipings, as the grass is called when separated from the parent plant, should be struck under a hand-glass, and, when well rooted, should be placed out in a bed not raised above the paths, but quite flat; the distance three inches apart in the rows, and the rows six inches from each other. Here they may remain until September, when you may use for a compost, two-thirds of loam from rotted turves, and one-third of well decomposed cow-dung. Let this compost be thoroughly mixed. Then take pots of the size called forty-eights, and, having a few crocks for draining in the bottom, fill all the pots half full of the compost; carefully raise the plants without breaking the fibres, and, adjusting the quantity of soil to bring the root up to its proper place, spread the root equally out all round, and fill up the pot, pressing the soil gently about the roots, and filling the soil in to the surface. The roots must not be sunk lower than they were in the ground, but the soil at top should be put level with the collar of the plant. When all the pots are gently watered, they may be placed in a common garden frame, with the glass shut close for the first twenty-four hours. The plants will be soon established, and all through the winter will require watering but seldom, and all the air they can have. The glasses should be off altogether in fine weather. The frames should be kept clean and dry, and the plants will go on well till March, when you must be prepared with other pots, in which they are to bloom. These should be the size called twenty-fours, and must be drained with about an inch thickness of crocks. The soil must be the same as has been already recommended. Turn up the pots, and knock the balls of earth out whole; the top surface may be rubbed off a little, and as much compost must be put into the pot as will bring the ball up to the surface; the soil is then to be gently pressed down all round with the finger, but so that the fibres are not injured in the operation.

They may be now placed in a dry bottom or floor, and have all the weather until they throw up their spikes for bloom. Allow but one to go up, break off the others, and, when the buds are beginning to swell, take off all but two, or three at the most; and, as these approach their bursting time; tie them round in the middle, and tear down the calyx at all the divisions, that the petals may be disengaged equally all round. The advantage of pot culture is found at this season; instead of stooping for hours over the bed to tie the pods, you may have the pots handed to you one at a time and the labour is changed to an agreeable occupation. We need hardly say that the flowers are better attended to all through their blooming. The petals are laid in their places as they are developed, and the flower, when required for exhibition, wants no more dressing. When the buds are swelling, a little manure water may be used once instead of plain water; this may be made with a spade-full of decomposed cow-dung, stirred into three pails of water.

[Why not exhibit the plants as grown in pots, instead of cutting the blooms?]

Miscellaneous Notices.

New Achimenes.—A Jaureguia, *Warczewitz*, introduced by M. Warczewitz, from Guatemala to Berlin, and thence to English gardens, is a handsome white-flowered variety of A. longiflora; it has a rosy stripe striking from the eye down each lobe of the limb. A. Escheriana, *Lemaire*, is a cross raised at Zurich by M. Regal, between rosea and longiflora; and is said to be handsome; it has the habit of rosea, but is stronger, and the flowers are intermediate in size between the parents; the limb rich crimson, the orifice golden yellow dotted with purple. A. grandis is an English cross between patens and grandiflora, and is a fine large deep purple rose variety; grown by Messrs. Garaway, Mayes, and Co., of Bristol.

Preserving French Beans in a green state.—M. Gehen, of Montigny, employs the following method for preserving French beans in a fresh and green state:—The beans are gathered when dry, and are plunged in boiling water, taken out again immediately, and allowed to stand till they are cool; they are then put into a small cask, a layer of vine leaves being placed at the bottom of the cask, then a layer of beans about six inches thick, and so on alternately a layer of vine leaves and beans; but the layer of leaves is to be kept thin, and when the cask is nearly full, the top must be covered with leaves. A board must be provided to fit within the top of the cask, and a good sized stone or weight placed on the board for the purpose of pressing down the contents. When the pressure has been completed, a quantity of salted water is put over the beans, sufficient to run down and moisten them freely. As this water will evaporate more or less, it must be renewed from time to time. The beans will, if thus treated, keep good till the following season, when others are fit for gathering, being merely covered over with a board to keep them clean. They may be used as wanted. —*Revue Horticole.*

Oxalis Deppei.—This plant produces fleshy roots, for the sake of which it is sometimes cultivated. The roots, which are thick fleshy tapering bodies, are of very delicate flavour, and are exceedingly wholesome, forming a good substitute for Seakale or Asparagus, from November to January. This Oxalis requires a warm sheltered situation, and a rich deep loamy soil. The

bulbs, which are produced in clusters around the thick end of the fleshy roots, may be planted some time in March, in rows a foot apart, and about the same distance apart in the rows; they should be put in three inches deep. During summer, they only require occasional hoeing, and watering when the weather is very dry. The fleshy portion, which is eaten, is not formed until late in autumn, consequently by the month of October the surface of the ground should be covered over with litter, as a protection from early frosts, and so that the roots may grow on without disturbance. By the end of November some of the roots would be ready for use, and may be taken up; but the majority should be left in the ground as long as possible, so that frosts and rain are kept from them, which may be done by means of any spare lights or shutters. Before the weather gets very severe they must be taken up and stored amongst dry sand, in a cool dry place, beyond reach of frost. A supply of the bulbs—the scaly bodies clustered about the base of the stems at the top of the fleshy roots—must be retained for the next year's planting. The young leaves and flowers are sometimes used in soups and salads, as are those of the Oxalis crenata, but for these purposes they are not of much importance.—*Anon.*

Turnips of Finland, and Petrosowoode.—At the present day many new varieties are cultivated in France; three of these, raised so late as 1848, from their great merits deserve particular notice. They are somewhat extensively grown in Finland and Petrosowoode, provinces of the Russian empire, and belong to the half hardy section. They are remarkable for their earliness, and do not appear to suffer from frost in the moderate parts of France, although the fleshy part of the root is almost entirely above the surface of the ground. These varieties do not present any striking difference except in colour, being equal in size; the general form is round and depressed, and the skin is smooth. One of them is of a beautiful violet colour; the flesh pleasant, and deep yellow of excellent quality; the root slender, short, without ramifications, and inserted in a deep cavity about three quarters of an inch in diameter at the surface, which cavity is very peculiar, and essentially characteristic of this sort; the leaves are always of a lively green, rounded at their extremities, and very deeply cut. For a general crop it is necessary to sow the seed of this sort from the beginning of July till the end of August. It thrives best in a sandy or light soil, and is apt to have an unpleasant acrid taste if grown in very rich ground. At the commencement of July 1847, in a visit to the Sennaia or vegetable market of St. Petersburgh, M. Masson noticed a quantity of these roots in excellent preservation, although obtained the preceding year; this fact sufficiently proves that their keeping properties are much greater than most of the other sorts. This vegetable is much used by the inhabitants of Finland; great quantities are also consumed by the Russian navy, and it is kept in store from one year to the other for this purpose. The vegetation of this variety, when in store, is considerably retarded by the leaves being taken off as soon as they are a few inches long; they form an excellent ingredient in salads, for which purpose they are much used. Swedish turnips are much used in England as house fodder for cows, but this new variety, from its earliness, has many advantages over them, as it may be sown at the beginning of September, and yield a good crop the same year. Very likely also these varieties in their young state may be found very good for pickling as well as similar culinary uses.—*Revue Horticole.*

CALEDONIAN HORTICULTURAL SOCIETY.

The Quarterly Meeting and Competition in Florists' Flowers, was held in the Society's Experimental Garden, Inverleith, on the 6th of June. The Hall contained a rich display of articles sent for competition, while the large Winter Garden structure was filled with brilliant flowers, sent for exhibition only. The best twelve Ranunculuses were sent by Mr. J. Young, gardener to T. Oliver, Esq., Newington Lodge, the varieties being Queen Victoria, Prince Albert, Minerva, Dr. Goldsmith, Ramsay, Florida, Earl Grey, Kilgour's Mottled, Vanguard, Apollo, Kilgour's Straw Mottled, and John Knox. Some very select stands of Pansies were produced. The Silver Medal was awarded to Mr. John Currie, gardener to Miss Wedderburn, Inveresk Lodge, for fine flowers of the following varieties:—Constellation, Magnificent, Model of Perfection, Cossack, Aurora, Blue Queen, Climax, Potentate, Lord Hardinge, Duke of Norfolk, France Cycole, Sambo, Supreme, Miss Wedderburn, Lord Nelson, Almanzor, Pliny, Marchioness of Ailsa, Douglas, Brilliant, Perfection, Optimus, Elegant, Hunt's Wellington, and Mrs. Bragg. A second premium was awarded to Mr. Alexander King, Inveresk, Musselburgh, whose varieties were—Rainbow, Supreme, Optimus, France Cycole, Marchioness of Ailsa, Potentate, Mrs. Bragg, Mrs. Hamilton, Zabdi, Constellation, Almanzor, Pliny, Magic Circle, Orestes, Lady Sale, Climax, Cremlin, Douglas, Alboni, Satirist, Elegant, Cypress, Ne plus ultra, and Aurora.

In the competition for Tulips, the only lot which was considered deserving of the prize, was set aside in consequence of an informality in the declaration by the competitor, Mr. John Oliver, Larbert.

The first prize for Pelargoniums was gained by Mr. A. Cossar, gardener to Lady Hay, King's meadows, Peebles, with Beck's Cruenta, Arabella, Gustavus, Centurion, Lyne's Chaplet, and Queen Anne. Ferns grown in pots were shown by Mr. R. Veitch, gardener, Arniston, who had fine large specimens of Pteris hastata, arguta, and rotundifolia, Adiantum pubescens, Asplenium viviparum, and Lygodium scandens; and by M. J. Thompson, gardener to Dr. Neill, Canonmills Cottage, who produced excellent plants of Adiantum Capillus-Veneris, A. pedatum, Trichomanes brevisetum, Asplenium filix-femina monstrosa, A. fontanum, and A. alternifolium. Messrs. Dicksons & Co., of Leith Walk; J. Dickson & Sons, Inverleith Nurseries; P. Lawson & Son, Golden Acres; Downie & Laird, West Coates; Carstairs, Warriston Lodge; and Stark, Edgehill Nursery, sent various collections of plants. Mr. Spary, nurseryman, Isle of Wight, sent a beautiful Double Pansy, named Prince Arthur. From the garden of Lady Hay, King's Mea-

dows, there was a very handsome seedling fancy Pelargonium, named Stranger, for which an honorary award was granted. From the garden of Dr. Neill, Canonmills Cottage, was Pothos Harrisii, in flower and fruit. Isaac Anderson, Esq., Maryfield, sent specimens of the new Dielytra spectabilis, Gompholobium luteum floribundum, Pimelea Neippergiana, and a seedling Veronica, a hybrid between saxatilis and fructiculosa. From Professor Dunbar's garden, Rosepark, there were some beautiful Heaths; and, from the gardens at Dysart House, there was a splendid display of seedling Rhododendrons. From Captain Falconar, Carlowrie, there was a fruiting plant of the Mandrake (*Mandragora vernalis*); and from Mr. Veitch, Arniston, a fine set of Ferns. Among the extra vegetables, were stalks of a very desirable Seedling Rhubarb, raised by Mr. Stewart, Bangholm Cottage, for which a certificate of merit was granted. Mr. Carstairs, Warriston, produced a broom made from Piacaba fibre, adapted for the sweeping of lawns.

Seedling Florists' Flowers.

Although during the month an immense number of seedling flowers have come under our notice, we regret to say, that, both in point of quality and novelty, a great majority of them have been unworthy of notice. Both at Chiswick and the Regents Park we have seen Petunias remarkable for nothing but the want of form, substance, and colour; Pelargoniums inferior to the discarded of seven years back; Antirrhinums that would disgrace a rubbish heap; and Verbenas inferior to the third-rates of last year; yet some of these things have received certificates of excellence, and next year, no doubt, will be let out as first rate varieties. Indeed, if the past is any criterion, judgment appears to have run mad. At the Surrey Zoological Gardens, where the seedling Pelargonium show was held, no first-class prize was awarded, but equal second prizes to Mr. Hoyle, for Ajax, and to Mr. Forster, for Gipsey Rival, a flower so like Gipsey Bride as scarcely to be distinguishable from it, and which never can be required in the same collection. We admit it is a pretty little flower, but its ground is preoccupied, and, therefore, it is not worth adding to collections containing Gipsey Bride. Again, equal third prizes were awarded to Mr. Hoyle, for Ocellatum, and to Mr. Beck, for Incomparable, and both are flowers which improve upon acquaintance. Ocellatum will be the sale plant of the season, and Incomparable, though a small trusser, produces them in tolerable profusion, which, added to its brilliant colour, will make it a very desirable flower. Most of the Pelargoniums enumerated last month we have seen for the second time, and have no reason to change our opinion of them. Major Domo and Diana, two of Mr. Beck's flowers, will be favourites with the public; and the same may be said of Generallissimo, May Queen, and Rubiola, belonging to Mr. Hoyle. Fancy Pelargoniums have been shown in tolerable abundance, and some possessing superior properties, and exemplifying something of the form which these flowers must ultimately assume to be lasting favourites with the public, and to make them efficient plants for decorative purposes. Pretty little things may please while they have novelty, but we must have size and colour to make them lasting favourites with the public. What is it that makes Reine de Francais so much admired but its size? It has no other quality to recommend it, yet it is an excellent sale plant. Another season's exhibition will work a revolution in these plants, and those who depend upon small flowers may regret that they were not wise in time. One of the most distinct and beautiful flowers which we have seen, is Beauty of St. John's Wood, from the Wellington Road Nursery. It is described below, and we were surprised it did not receive a certificate at the South London Floricultural Society. As a fancy flower it was more worthy of such distinction than some which have received prizes.

PELARGONIUMS.

Cardinal (Hoyle).—Bright orange scarlet, rich black blotch, slightly crumpled, free.

Dido (Hoyle).—Rosy purple, top petals nearly black. Fine form and good truss.

Gipsey Rival (Forster).—Upper petals nearly black, lower splendid rose. Fine form, very smooth, and a free bloomer.

Van Spry (Forster).—Like the preceding, but not so good.

Alibi (Forster).—A Forget-me-Not like flower, but not so free in the production of them.

Crimson Standard (Forster).—Rosy crimson, black blotch. Good truss and moderate form.

Rubens (Forster).—Light crimson, with dark blotch. Good truss and tolerable form.

Hero (Forster).—Scarlet with deep chocolate blotch. Tolerable truss and form.

Vandyke (Forster).—Rich scarlet, very dark blotch. Moderate form and truss.

Little Nell (Forster).—Rosy purple, dark blotch. Good truss and moderate form.

Supreme (Forster).—Rosy salmon, rich chocolate blotch. Good truss and moderate form.

Agatha (Beck).—Upper petals deep chocolate, with rich blotch; under petals rose. Form moderate, a free bloomer.

Silk Mercer (Beck).—A beautiful rose colour, with rich blotch. Fine form and free.

Prince Arthur (Beck).—Rosy crimson, black blotch, lower petals spotted. Good truss and moderate form.

Naval Knight (Whomes).—Fine scarlet, black blotch. Good truss and form; very free bloomer.

Gipsey King (Whomes).—Rosy crimson, upper petals nearly black. Tolerable form.

Prince Arthur (Pontey).—Rosy salmon, chocolate blotch, and clear white throat. Very free.

FANCY PELARGONIUMS.

Purity (Henderson).—Rosy crimson, with white margin, lower petals belted with crimson. Moderate form.

Beauty of St. John's Wood (Henderson).—Rosy crimson, with pure white throat, lower petals belted with the same colour. Fine form and free.

Perfection (Ambrose).—Bright rose belted with white; lower petals spotted with lilac.

Prince Albert (Ambrose).—Purplish crimson, with a shade of violet. Good form and free.

Supreme (Ambrose).—Rosy crimson; lower petals spotted with the same colour. Dwarf habit, moderate form, and free.

Belle Marie (Ambrose).—Rich mulberry, lower petals spotted with the same. Moderate form and truss.

Amelia (Ambrose).—Light rose, lower petals clouded with the same. Free.

Ovatum (Ambrose).—Deep crimson, lower petals belted with the same. Moderate form.

Formosissimum (Ayres).— Crimson, belted with white, lower petals spotted and pencilled with the same colour. Fine form.

Caliban (Ayres).—Fine plum colour, shaded with violet, lower petals deeply spotted with mulberry. Fine form and large.

Gipsey Queen (Ayres).—Rich plum colour, belted with white, lower petals slightly marked with plum colour. Fine form and large.

Brunette (Ayres).—Rich velvety chocolate, belted with white, lower petals spotted and pencilled with the same. Moderate form.

Lilacinum (Ayres).—Pinkish lilac, belted with white, lower petals slightly spotted with the same. Deficient in form, but a good trusser and very free. A.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR JULY.

FLOWER-GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Here little need be added to the directions of last month. Attend to cleanliness with scrupulous care in every part, and pay strict attention to the destruction of insects. Water the plants in the borders copiously when necessary, using liquid manure occasionally, and ventilate freely both night and day. Shading will be necessary through the hottest part of the day. Syringe the plants not in bloom every evening, and sprinkle the floor of the house once or twice a-day to generate a moist atmosphere.

Orangery.—Proceed with the thinning of the fruit, and syringe the plants copiously every afternoon, just as the sun is leaving it, shutting the house close for an hour or two, but giving a little air again in the evening. Water copiously with manure water, train and stop undue growth, and guard carefully against insects, more especially the red spider, which is very destructive to the leaves of the orange. Any plants requiring a shift must be attended to immediately, so as to get the roots thoroughly established before winter. A.

Orchid House.—Continue to carry out former directions, and keep every thing thoroughly clean; this is most important. Remove every appearance of weeds or ferns (unless placed there for the purpose of ornament) growing upon the pots or blocks, as by experience I find they injure the plants by poisoning the roots in some cases. Keep the sponge at work whenever it is necessary, for, depend upon it, much of the health and vigour of these truly lovely plants depend upon a free and uninterrupted respiration. See that nothing be neglected or placed out of sight. In arranging the plants that are in bloom do it effectively, and re-arrange frequently, for it promotes very much the health of the plants, while it heightens the interest of the house. Look well to all plants that are making fine growth, and encourage the formation of strong pseudo bulbs by frequent sprinklings over head.

Stove.—Be very liberal in giving abundance of air night and day, at the present time; keep the atmosphere in a fine growing state by frequently syringing all fast growing plants, and, at the same time, thoroughly saturate the floors, tables, and walls, about noon. Give timely attention to winter flowering plants—such as the different kinds of Justicias, Euphorbias, Gesnera zebrina, Begonia, Manettia bicolor, and all the sorts of Puyas; these, together with anything else that has had a good season's rest, should be properly pruned, and when they have commenced growing should be well potted into good turfy loam, and a little peat and sand used in a rough state, the pots being thoroughly drained with charcoal. Let this house have a good share of sunshine morning and evening, which will materially prevent weak growth, which must be avoided, even as insects and vermin of all kinds. J. G.

GREENHOUSE—HARD-WOODED PLANTS.

This is the best month to procure the annual supply of soil, which, for hard-wooded plants, is an important although generally not a very troublesome matter. Three kinds only are wanted, viz., a light heathy sort of peat from some rather high situation, to be used for the finer and tender rooting plants, and a stronger grassy kind for the more robust growing sorts. These, with a little turfy loam, and some good silver sand, will grow as fine plants as any one could wish to see.

Some of the large specimens which have been cut in after flowering, and are standing in a shady situation out of doors, will now require shifting; let it be proceeded with at once, and take care that the old ball is moist at the time of potting. Do not water them thoroughly immediately after the operation, but allow them to stand for a few days, be sure, however, to sprinkle their foliage and the ground round about them in hot, dry weather.

The young stock, in pits or frames, will require constant attention; shift a plant now and then; turn them round occasionally, and otherwise train them at every opportunity. Examine Leschenaultias for greenfly, Chorozemas, Pimeleas, &c., for red spider; fumigate the former, but lay the latter down on their sides and give them a good washing with the syringe. At the end of the month, should the weather be fine and warm, the lights may be left off all night, but replace them early in the morning and let them remain tilted all day.

Good hard-wooded plants in bloom are scarce at this season of the year; however, the house should still be gay with such things as Crowea saligna, Burtonia conferta, Astelma eximia, Relhania squarrosa, Sollya linearis, Roellia ciliata, Dracophyllum gracile, &c., these, with the different varieties of Kalosanthes, will make no mean display.

Look well to Epacris and other early flowering plants, which will now be pretty forward in their growth; tie and regulate them nicely before the shoots begin to fall about with their own weight. Attend regularly to shading, &c., as recommended last month.

Camellias.—This is the time for shifting; when the bloom buds are forward some of the plants that do not require repotting may be set out of doors in a perfectly shaded place. Regulate the moisture according to the weather, but, in a general way, a good syringing every afternoon and a slight sprinkle in the morning will do no harm. Towards the end of the month, any sorts that it may be desirable to increase, can be grafted; put them under hand-glasses and keep them well shaded.

Azaleas.—Here last month's directions must be attended to, but towards the close of the month begin to inure the plants to a little more sunshine. J. F.

Heathery.—All specimens which have done blooming and have been cut in, and are breaking again will

be best in the open air, in a rather shaded situation. Pot any plants which may require, preparing the soil as previously directed. Water copiously, using very weak manure water occasionally, keep a sharp look out for mildew, and dress the plants with sulphur directly it is perceived. As the plants go out of bloom cut them in, and remove the decaying flowers; but do not shift them until they break and are growing again. Young stock will require the same attention, but take care it never wants water. Water the plants over head occasionally with a fine rose. J. F. C.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—The season being now well-advanced and the plants generally in flower, shading through the middle of the day is necessary to prevent the flowers from scorching, and to cause them to hang on much longer. Thin net or gauze, fixed on the sashes through the summer season, will not be found to injure the plants. Gauze should also be fixed in the inside of the house to prevent the bees getting in, as the flowers fall directly the honey is extracted from the nectary. When the plants are dry be careful to saturate the whole mass of soil; liquid manure two or three times a-week is necessary, to keep them in a vigorous state of growth, so that they may throw up their flowers freely. Remove all decaying leaves and flowers as they appear, Leave air on the house through the night, and sprinkle the bottom occasionally in the evening, which will cause a moist atmosphere, and greatly assist the plants. Strike cuttings of the early kinds which have gone out of flower. They may be put in under hand-glasses, or in a partially shaded situation in the open ground.

Fancy Pelargoniums.—Be very careful in the watering of these. Do not allow them to get too dry, so as to require a great quantity of water at one time, or they will be found to shank off. A little liquid manure once or twice a-week may be given while in a free growing state, but withhold it as they grow out of flower. Strike cuttings of such kinds as are required for next season's growth, as they will be found to strike more readily at this season than later. They will require protection with hand-glasses or cold frames. Do not water too liberally.

Calceolarias.—Look carefully to the shading and watering of these, and see that those going out of flower are removed to a shady situation, where they will throw up their offsets, which must be taken off for cuttings, as soon as large enough. They will require a very sandy compost. The north side of a hedge or wall will be found the best situation for them.

Cinerarias.—If large enough, pot into separate pots those sown last month. Place those gone out of flower in a shaded situation. Take off the suckers as they get large enough, and pot into separate pots. Sow seeds for spring flowering in a light rich compost, cover lightly with fine mould or silver sand. Do not allow the surface of the soil to get dry, and they will be found to vegetate quickly. A cold frame will be found the best place for them. Prick off into store pots as soon as large enough.

Chrysanthemums.—Cuttings may yet be struck for late-flowering plants. Divide the old shoots, and pot into a good rich compost. As soon as established, water liberally. Layer some in pots, and as soon as they are rooted stop them that they may make bushy plants.

Routine.—Prepare soils for autumn use, as recommended last month. After they get a little decomposed, turn occasionally to mix them, and allow the atmosphere to act freely on them. Turn heaps of manure occasionally for the same purposes. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

That angularity so observable in newly-planted flower-beds is wearing off as the plants approach each other, and the points of the beds get filled up; indeed, there is more of a life-like expression seen every day in the flower-garden, as the masses go on growing and rounding themselves into symmetrical forms. Beauty, like life, makes a poor show in connection with poverty; therefore by all means encourage massed plants to cover the ground, and when the beds are full enough do not suffer one mass to grow out of its place, and assume an irregular appearance, or the balance of the beds will be broken up. Introduce disorder into one part, and you derange the whole. On the other hand, take care to avoid everything like a trim-cut hedge-like appearance on shorting back the plants at the outside of the masses, or else the line of art will look severe from every part. According to the magnitude of the mass, so should the curve of the line be, by which the plants are turned or cut off to the grass or gravel. To know the relation this line bears to the mass is the first step to a knowledge of the relation which subsists between the bed and the space which lies beyond it. But the eye does not stop here, for it goes on measuring the one mass by the other, and determining differences where they exist, and where things agree, and thus is a knowledge arrived at of the proportion which prevails throughout the arrangement in our flower-beds. Flower-gardening, like every regular and well-conducted system, is composed of a variety of parts, each of which possesses its separate importance, and contributes to the perfection of the whole. Some things are very essential to it, such as neatness and a love of order and method. Order is the source of peace, and it is impossible to find a more peaceful scene than a well-managed flower-garden—for tranquillity is the distinguishing characteristic of it. Let this be wanting, and anything but the appearance of a well-massed flower-garden will present itself. If disorder and irregularity meet us at every step amongst the beds, the arrangement is incomplete, and the parts must necessarily jar with one another, and only discord be apparent, where the principles of harmony should have been clearly seen, and powerfully felt in the parts, and spread over the whole figure. Nature is rich with meaning on this point. No line nor form but she turns to a right use, whether it be seen in stone, or tree, or humblest bush. All strong-growing plants, such as Solidagos, Asters, Rudbeckias, and Helianthuses, which may properly be termed shrubby plants, should be attended to, so that each and all of their parts may grow together, and by and by give expression to the scene. Take care that Hollyhocks planted on the lawn, as single specimens, or groups of the same, have stakes put to them in time, and by all means try to keep the leaves healthy, either by syringing the foliage, or watering at the roots, particularly if the weather is hot and dry. Tie up Œnothera speciosa neatly, and if it has been pretty thickly planted over the bed, it will produce a fine white mass of flowers. Also train the shoots of Œnothera macrocarpa in such a way that they may have light and air, and be furnished throughout with flowering shoots; water them abundantly in dry weather, and clear off the dead flowers and leaves, which are so often seen accumulated about the plants. Matricaria grandiflora requires similar treatment, and its white flowers are very desirable too. Verbena Defiance will require occasional syringing with tobacco liquor, not too strong though, and many other plants will require to be treated and looked after in the same way.

Propagation.—Cuttings of Cerastium tomentosum put in a cold frame, and shaded occasionally, will root

very soon, and make beautiful white masses next year about this time. So will Achillea tomentosa, if treated after the same manner. Save all the seed that is possible of Papaver bracteata and orientale: they are brilliant and showy at this time of the year. J.C.

Rose Garden.—The autumn-flowering Roses should now be liberally supplied with manure-water, or some guano laid on the surface of the ground round the plants, and then the ground be well soaked with soft water. Keep all the faded flowers picked off every morning, and the seed capsules also.

Get the budding done as fast as possible, and should the weather be dry, give the stocks a good supply of water to keep them growing freely till they are budded, after which artificial watering will be unnecessary.

Those plants which have flowered in pots should now be kept growing freely, as the future bloom depends on the growth they make at this season.

Climbing Roses, if doing well, will be constantly pushing out very strong shoots from the roots and main stems; these, if not wanted to replace any shoots that are getting worn out, must be either taken off or have their tops pinched off about a foot from the stems, or they will very soon starve the other branches. H. M'M.

Arboretum.—Here at this season the operations are principally limited to keeping everything neat and in good order. It will, however, be necessary to pay particular attention to the watering of newly planted trees, but more particularly to keeping them firm in position, as a tree which is swayed about by every breath of wind cannot perfect its roots so as to fix itself, and must, therefore, be secured. I will now resume my list of Coniferous plants.

Pinus Pallasiana (Siberia, 1820).—This is a very robust and hardy species, of compact habit, dense foliage, and very ornamental; deserves a place in a limited collection.

Pinus patula (Mexico, 1826).—A very elegant species, but not to be thoroughly depended upon. We have a specimen fourteen feet high, which is much admired; the last winter has turned many of the leaves brown, but I cannot see that the leading shoots are injured. It should have a sheltered situation.

Pinus Devoniana (Mexico, 1839).—A splendid foliage, very robust in its habit, and, if it proves quite hardy, will be second to none for beauty. Here it was more exposed than patula and suffered less.

Pinus Teocote (Mexico, 1826).—More sheltered than either of the last, and not at all injured; should it eventually prove quite hardy, it will be a most desirable species.

Pinus Monticola (California, 1831).—Probably only a variety of Pinus Lambertiana, which it closely resembles, both in habit and manner of growth, but this appears to be the more hardy of the two.

Pinus Gerardiana (East India, 1839).—Great things are expected of this species, the habit being so very distinct. At present it is thoroughly hardy. Our plant is four feet high and vigorous.

Shrubbery. Here, also, the principal work is to keep good order, and as we have had comparatively but little rain, the directions as regards watering, mulching, &c., given last month, must be attended to. J. C. R.

Carnations and Picotees will now require disbudding. Examine them carefully to see they are not suffering by being too tightly tied, as the shoots will be found to have swelled since they were first tied. The pods should be tied with worsted, or some such material, and, as they advance, be shaded from the sun. Let the plants have plenty of water, and occasionally a little liquid manure. Keep them clear of weeds, and towards the end of the month the grass will be in a fit condition for layering. Weed out the seedlings as they come into bloom and are found to possess no superior claims, marking those of good properties for further trial.

Dahlias.—Attend well to the directions given in last month's calendar; and as the lateral shoots attain sufficient length tie them outwards, avoiding the practice of drawing them up into the broom-like fashion, preventing air and light from penetrating, forming a convenient hiding place for insect enemies, and diminishing the size and beauty of the flowers.

Hollyhocks.—Secure to stakes as they advance in growth, reducing the flower-stems to one or two on each plant. Stir the soil, and water as often as the state of the soil requires.

Pansies.—Examine the beds and gather the seeds, as they ripen, from those flowers best in form and purest in colours, which should be put into muslin bags and hung up to dry. It may be sown when ready. Cuttings may still be taken off and struck in the shade, and those previously rooted planted out. Attend well to watering, cleaning, and destroying insects of all sorts. Blooms for exhibitions should be shaded, though they are not to be got as fine as in May under any treatment.

Pinks.—Pipings may still be struck under hand-glasses, and those first struck will be ready to plant into nursery beds, to strengthen them for their final planting. Water the plants well, or the dry weather otherwise will cause the grass to become hard and difficult to strike. Blooms intended for exhibition should be shaded. When seed is required advantage should be taken of the flowers possessing the desired properties, by fertilizing them, which will make the chance of raising good varieties more certain.

Phloxes.—Attend to the directions given last month, by tying, watering, and stirring the soil, &c., &c.

Ranunculuses. As the blooms of these fade and the leaves die off, no time should be lost in taking them up, drying them in the shade, cleaning, and stowing away in their proper places till next season.

Tulips.—Continue to take up, clean, dry, and store away as recommended for the Ranunculus. T. B.

FRUIT GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—Now that the days are at their full length, and light at its maximum take advantage of it to grow your plants and fruit as rapidly and robustly as possible. Syringe copiously daily, shut up early, but give a little air before leaving for the night. Ventilate very freely during this fine weather; indeed the lights may almost be removed altogether during a part of the day. Water copiously with liquid manure at the roots, to all but ripening fruits; and those, when they begin to change, must be kept comparatively dry. Pines growing on the Meudon plan will now grow with great rapidity; encourage them by copious syringing with clean water, and, if necessary, give the border a thorough soaking with liquid manure.

Succession House.—Any succession plants not shifted last month must be attended to immediately, and water may be given more copiously to those which are established in their new pots. Maintain a moist growing atmosphere, and give abundance of air both night and day. Syringe copiously every afternoon, and shut the house up close. Attend to the bottom heat, and guard against its becoming too powerful.

Vinery.—The principal care here is to thoroughly ripen the wood in those houses where the fruit is cut, and to bring those plants intended for early forcing into a state of rest as soon as possible. Where the fruit is colouring give abundance of air at all times, and where it is swelling maintain a moist growing atmosphere, by

frequently sprinkling the floors and walls of the house, but avoid syringing the fruit. Guard carefully against insects, and also against the mildew, which is committing sad havoc in some places. Proceed with the thinning of late houses, and recollect that a moderate crop well ripened is preferable to a large crop of indifferent quality. J. S.

Figs.—Give a liberal supply of water to trees swelling their second crop of fruit; use the syringe freely; and maintain a moist atmosphere by well wetting the path-ways, and give air early in the day, and freely; shutting up rather warm. See that the shoots do not become crowded. Where fruit is ripening, water, as previously advised, must be withheld. Directions given in former calendars must be attended to.

Peaches.—Having, in our last, called attention to the necessity of well ripening the wood; and having shown that this depended entirely on the healthiness of the leaves, and on their duly, and properly performing their functions, we now direct attention to a practice, which was formerly thought essential to the well ripening of the wood—namely, that of exposing the trees, by taking the lights off the house. We cannot conceive what put this idea into the heads of our forefathers, but most assuredly a worse plan they could not have adopted. We never remove a light so long as the leaves are able to operate—but we give air at night, as well as by day. By this plan, and by keeping the leaves healthy as long as possible, we have always had well-ripened wood. Where late crops of fruit are swelling, water must be supplied liberally—and where fruit is ripening, it should be withheld, and air given early in the morning. Pay attention to previous directions.

Strawberries.—The quantity of plants required for forcing next season, should now without delay be laid in small sized pots. One plant in a pot is quite sufficient; when two or more are put into a single pot, the crowns never get so fine, and well formed in consequence of the crowded state of the foliage. Those laid last month will now be fit for potting. M. S.

Cucumber House.—In very hot weather attend strictly to shading early in the forenoon, and remove it early in the afternoon. Apply the syringe freely early in the afternoon, and shut up soon; that will be a great check against insects. If red spider make its appearance, thin the leaves out to the utmost limit, then, early in the morning, sprinkle the underside of the leaves with a fine syringe, and dust over with sulphur. If the plants are otherwise in good health, there will be no fear of their scalding, if they are shaded from the mid-day sun, and this, with a high, moist, day temperature, will soon disperse the spider. If the nights should be cold, slight fires, occasionally, will greatly benefit the plants, and prevent the ravages of the mildew. Look carefully after young plants, that are growing, to take the place of any that may be past bearing fruit.

Dung Beds.—Although the season has advanced so far, the beds must continue to receive attention. The linings must be kept well made up, and to keep down wood-lice, must be occasionally watered, to prevent their becoming too dry. Keep the plants thin of wood and foliage, and they will continue in a thriving state to the end of the season.

Ridge Cucumbers.—The glasses may now be placed upon inverted pots, and the shoots pegged out regularly, so as to give them all the light possible. Let them ramble freely without stopping. If precaution has been taken to sow a row of Scarlet-runners on the south side of the ridge, it will be found of great service in strong windy weather, also in very hot weather.

Melons.—Look to the young plants, see that they do not suffer for want of water in the early stage of their growth, pinch out all superfluous shoots, and remove all male blossoms. Earth up late crops with stiff loam, and press it firmly down. The plants that are swelling their fruit must have strict attention, and see that each plant has its proportion of fruit to mature; better to have a moderate crop well ripened, than attempt a large crop, and fail, which is too frequently the case. Where fruit is ripening, keep the inside of the pit or frame perfectly dry, and if any sign of splitting appears, give abundance of air night and day. W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

Apricot, Peach, and Nectarine.—Should the weather prove dry when the fruit of the former is swelling, give the trees a good soaking with water, and immediately mulch them thickly. If this is done properly, it will prevent evaporation, so that frequent waterings may be dispensed with. The Peach and Nectarine are very subject to the attacks of red spider during dry weather, particularly weak and unhealthy trees; where this is the case, wash them with water in which some flower of sulphur is held in suspension. Drought at the roots is one of the sources of this evil, which of course is to be remedied by the means recommended above. Continue to lay in the shoots, so as to allow every part of the trees the benefit of the sun, air, and rain.

Fig.—There are few fruit trees that require more attention in stopping, during the early part of the growing season, than this, and yet there are few trees give less general trouble. I believe the want of success in growing this fruit, arises from an over-careful attention to what is called neat training, which is, laying in every branch close to the wall; whereas, if the side and foreright shoots were allowed to grow a foot or eighteen inches from the wall, a sure crop would be the result.

Gooseberry and Currant.—Stop and thin the shoots of espaliers, and those growing against walls; this is especially necessary, and even those growing in plantations would be greatly benefited by having their shoots thinned. Mat those that require to be retarded for late use, before the fruit is quite ripe.

Pear.—If the fruit is found to have set very thickly on the choice sorts, either those against the wall or espaliers, they should be thinned at once. One dozen fine large fruit, is of more value than three dozen small, as they are superior both in flavour and beauty; but, although knowing this, it is with difficulty we can bring our minds to have the courage to thin the fruit sufficiently. Tying and nailing the principal shoots must be strictly attended to, as they are easily broken by the winds while in a young state. In stopping the side shoots, the opposite extreme of allowing them to grow two feet long, ere they have their summer pruning, must be guarded against, for, if they are stopped very closely after the first stopping, it will probably cause some of the dormant buds at the base of the shoot to break.

Plum and Cherry.—Should insects still infest the trees, means must be used to get rid of them before the fruit ripens. The latter must not be washed with anything offensive in the water, otherwise than by dipping the shoots into it, until the fruit is gathered. Should the fruit of the large sorts have set too thickly, it will be necessary to thin them. Those taken off will do for tarts.

Raspberry.—Thin the young canes to from four to six to each stool, and keep them secured to the stakes, so that they may not be injured by wind. It is a much better plan to grow them in rows, and tie them to espalier rails, than to have them in single stools; for, by the latter plan, it is almost impossible to secure the young canes, without greatly interfering with the fruiting canes, whereas, by the former mode, they may be so regulated in the row as to allow the full admission of light and air to the fruit, and to allow of their being

gathered without injuring the young canes. It is very easy to adopt the espalier mode of growing, where they have been otherwise grown, by allowing all the young shoots in the line of row to grow up, and, in a year or two, the object will be gained.

Strawberry. -Immediately well-rooted runners can be procured, make new plantations. The earlier they are planted the better, as they will have time to get thoroughly established before winter. Even weak and indifferently rooted runners, if planted this month, will, on the approach of winter, be greatly in advance of strong runners planted the latter end of next month. Should the weather prove dry, give copious waterings while the fruit is swelling. The late sorts more frequently suffer from drought than the early ones.

Vine.—Keep the young rods, or shoots intended for bearing next year, secured to the wall, and the leaves from injury as much as possible. Stop the lateral shoots to one joint, so that there is free admission of light and air to the main shoots. A great many Vine-leaves are usually required during the summer; but, if the Vines are expected to flourish and fruit, they must not be divested of their leaves. A few plants should be allowed to grow at random in some sheltered spot, for this purpose. H. C. O.

KITCHEN GARDEN.

Prepare all ground, as soon as it becomes vacant, to receive such plants of the Brassica tribe as will be required for the supply of the table throughout the autumn and winter months. The transplanting of Cauliflowers, Cape and other Brocolis, Savoys, Brussels Sprouts, &c., should be proceeded with on every available occasion. Every advantage should be taken of showery weather, and as large *breadths* as possible got out, in order to economize the time and trouble of watering. Continue to put out Celery in well manured trenches, in such quantities as the demand renders necessary. Another sowing of Peas may be made for the chance of a crop; in light soils, frequent and copious supplies of water will be found necessary, or a very limited crop will be the result. No plants will derive greater benefit from mulching, than the crop of Peas. Any spare dung, or even the sweepings of lawns, can be advantageously employed for that purpose. Endive and Lettuce should be planted out regularly to ensure a supply, and sowings of Radishes, Lettuce, Endive, and small salading, made, as recommended in former calendars. Hoe and stir the soil between all growing crops, to destroy weeds, and promote a healthy and vigorous growth in the plants. Sow a good breadth of Turnips for succession, and also Cabbages for winter greens. Prepare, by well manuring and trenching, some ground for winter Spinach, which, in cold soils and late situations, should be got in the end of the month. Shallots and Garlic will soon be fit to store, and as the herbs come into bloom, cut and dry them in shaded, airy situations, after which, bag them until required for use. J. C.

WILD FLOWERS OF JULY.

In this and the following month we meet with the greatest number of plants in flower; the Ferns also now present their fructification, and the working botanist will find full occupation in attending to the numerous claimants that press themselves upon his attention. In July the important family of the Leguminosæ may be considered in their prime, as also the Labiate plants, among which the Mints still require especial attention. The tall spikes of the Foxglove, with their bright bells, remind us of the advance of the season; the Heaths begin to tinge the moors and commons with their bright colours, and the hedges, fields, marsh land, and open downs, teem with blossoms, representing almost all the indigenous families. Out of such a copious list it is difficult to select any as prominently noticeable at this time. This is the best month for observing the flowers of most of the Syngenesious and Umbelliferous plants, the fruits of both coming to maturity toward the close, and more particularly in August. The puzzling tribe of Brambles should now be looked to, and it is the most favourable time for the sedges, most of which now show the characters derived from their ripened "nut." Ponds and ditches should be well searched in July; many of the plants growing in such situations have inconspicuous flowers, but they nevertheless exhibit a great variety of interesting forms. The principal of these are the Pond-weeds (*Potamogeton*), the Duck-weeds (*Lemna*), Water Milfoils (*Myriophyllum*), the Star-worts (*Callitriche*), which require close attention, associated with the more striking Water Lilies, Buck-bean (*Menyanthes*) Water Plantains (*Alisma*), the beautiful Villarsia, the curious Bladder-wort, (*Utricularia*), with its feathery leaves, floating by means of their purse-like air-bladders. Many striking flowers are also to be met with by the sea-side in this month, such as the yellow horned Poppy (*Glaucium*), the Thrifts (*Statice*), with some members of the Cruciferous, Leguminous, and Syngenesious orders. A. H.

ANIMAL KINGDOM.

Ornithology.—The scorching heat of July, has a great effect upon birds, they are now almost mute, and difficult to be seen; sheltering themselves from the fierce rays of the sun, among the thick foliage, all the evidence of their presence being their call note, which they repeat at intervals, but in so low a tone, that it is a mere whisper, compared to what it was in the spring. The only time that they exhibit a portion of their former sprightliness, is at early morn, before the sun has robbed the hedges of their dewy spangles, and at eve, just before the glorious orb bids us a short farewell, to bless some other clime with his heavenly light. The best time for observation is the morning, all things then look fresh and gay, and one is not annoyed by the numerous little pests of the insect world, which, as the day grows older, dance, and buz around one's head, robbing a ramble of half its pleasures.

In studying the habits of birds, the manner in which they propel themselves through the air is not the least interesting, and a knowledge of their various modes of flight, is of great importance to the naturalist who should be able to distinguish each species of bird, as well on the wing, as when perched on a branch within a few yards of him; and this knowledge may be acquired by proper attention, and will be found to add greatly to the pleasure of the study. How peculiar is the flight of the Wagtails (*Motacilla*) rising and falling like the waves of the sea, when contrasted with the swift gliding motion of the Swallows (*Hirundo*). Who has not admired the powerful flight of the beautiful Wood Pigeon (*Columba Œnas*), when, like a giant in strength, he has been seen beating against a strong head wind, he appears to set old Boreas at defiance, pursuing his course in nearly a straight line, while the Rooks, and Crows, although strong-winged birds, may be seen rising and falling, as if searching for some hole in the wind; through which they might creep and after many attempts giving it up as hopeless, when wheeling round they glide swiftly before it; the whole of the Pigeon tribe, are noted for their great strength of wing, and beautiful mode of flight.

Turn we now to those frail little things, the various species of Warblers, that visit us during the summer months, taking their abode in our lanes, on our commons, and in our gardens, where they skip and hop about, their flight rarely extending many yards at a time, and yet they have been born some hundreds of miles upon those little wings, which, when arrived here, they use so sparingly. What beautiful machines are

the wings of birds, and how varied are their forms, and texture; compare the soft downy one, of the common Gold Crest (*Regulus auricapillus*) with the strong whale-bone like texture of the Swifts (*Cypselus apus*), and you will be struck with the fact, that their mode of life must be widely different; and this will prove, that an acquaintance with the various forms and textures of the wings of birds, is essential to a true knowledge of their habits. The fields of golden grain are now a glorious sight, and birds of various kinds resort to them, amongst which the most numerous are our old friends the Sparrows (*Passer domesticus*). I call them old friends, for there is no bird I am more partial to than the Sparrow, although by many he is considered a complete pest; but that is for want of knowing all his good qualities; if it were only for his close attachment to man, he would deserve our respect, but he has many other virtues to recommend him, which are overlooked from a want of a knowledge of his history.

The farmer, when he sees them in his fields of corn, considers them as thieves and plunderers, and to a certain extent he may be right; he has clear evidence that they are then doing him no good, and so they are unmercifully condemned. I think by a better acquaintance with their mode of life, a different conclusion would be arrived at. There are not always corn fields for them to feed upon, and I believe they eat at other times. Then, keep a calendar of them from January until December, watch them narrowly, book all their good and bad actions, and having gone through all the evidence, judge justly, and I have little fear of the verdict; for it will be found that birds, instead of being destroyers, in which light they are considered by many, are a safe guard to the husbandman, and that the earth would soon become a desert, without their aid. H. W.

Entomology.—We are now arrived at the hottest season of the year, when the objects of the entomologist's search assume their most tropical character; amongst which may be mentioned the great number of species of Butterflies, the largest sized kinds of Beetles—such as the Stag Beetle, Cerambycidæ, Sand Wasps, and the great Dragon-flies, hawking over pools in search of insects on which they feed most voraciously. Although these insects, however, delight in the brightest sunshine, the hottest hours of the day are by no means the best suited for the pursuits of the entomologist, the flight of insects being, at that period, so rapid, as well as so high, that it is almost impossible to catch them, whilst others secrete themselves to avoid the heat. Of this habit of insects flying high during the middle of the day, accompanied, as it is in some species, by the emission of a loud humming sound, our field poets and naturalists have often spoken. Thus, Thomson says:—

> "Resounds the living surface of the ground,
> Nor undelightful is the ceaseless hum
> To him who muses *through the woods* at noon;
> Or drowsy shepherd, as he lies reclined,
> With half-shut eyes, *beneath the floating shade*
> *Of willows* gray, close crowding o'er the brook."

"There is," says Gilbert White, "a natural occurrence to be met with in the *highest part of our down*, on the hot summer days, which always amuses me much, without giving me any satisfaction with respect to the cause of it; and that is a loud audible humming of Bees [?] in the air, though not one insect is seen. Any person would suppose that a large swarm of Bees was in motion, and playing about over his head." Kirby and Spence, alluding to this sound, observe, that "the hotter the weather the higher insects will soar, and it is not improbable the sound produced by numbers may be heard when those that produce it are out of sight." Without attempting to solve the question as to the cause of this humming noise, I may observe that, as our poet of the "Seasons" has well remarked, in the words quoted above in italics, it is in woods and trees that the sound is heard as well as in open situations, and that it seems to be caused by Dipterous insects, rather than by Bees, which, except at the time of swarming, do not fly in company.

Now

> "Chief, the forest boughs
> That dance unnumbered to the playful breeze,
> The downy orchard, and the melting pulp
> Of mellow fruit, the nameless nations feed
> Of evanescent insects."

The Caterpillars of many species of Lepidopterous insects may now be found, and must be carefully attended to, the best time for beating the trees being early in the morning and after sunset, as during the day many of them remain quiescent, fixing themselves firmly to the branches and twigs, and only moving when the sun has quitted their retreat. The umbelliferous flowers, and especially the flowers of the Elder-bush, should now be examined carefully in the hottest parts of the day, whilst the grassy banks and borders, as well as open places in woods, are now enlivened with many species of Butterflies, especially the different kinds of Fritillaries—as Lathonia, the Queen of Spain; Aglaia, the dark green Fritillary; Adippe, the high brown; Papbia, the silver washed; and Silene, the small pearl-bordered Fritillary. The Painted Lady, Cynthia Cardui, is now to be met with, delighting to settle on the blossoms of the Spear Thistle, on which its larva feeds earlier in the month; the beautiful Peacock Butterfly, with its gorgeous eyes (*Vanessa Io*), found on Nettles, in the Caterpillar state, towards the beginning of the month, appears in the winged state at the end; the glorious Purple Emperor Butterfly also makes his appearance about the middle of the month, fixing his throne on the topmost twig of some lordly Oak, and defending it with the utmost pertinacity against all neighbouring rival Emperors. The elegant White admirable Butterfly, is also now to be met with, although rarely; "The graceful elegance displayed by this charming species, when sailing on the wing, is greater, perhaps, than can be found in any other in Britain."

> "Swift Camilla scours the plain,
> Flies o'er the unbending corn, and skims along the main."

"There was an old Aurelian of London," says Haworth, "so highly delighted at the inimitable flight of the Camilla, that long after he was unable to pursue her, he used to go to the woods, and sit down on a stile for the sole purpose of feasting his eyes with her fascinating evolutions." What a charming picture of the endurance of a pure love of Nature does this little extract vividly bring before us!

Many of the species of the elegant little Blue Butterflies, Polyommatus, are now on the wing, especially on chalky districts; but perhaps the most exotic-looking of all the insects now to be met with are the Ægeriæ and Trochilia; Lepidopterous insects having all the appearance of Wasps, Bees, and Sand Wasps of different kinds.

Many of the larger species of Moths (*Bombycidæ* and *Noctuidæ*) are also now to be met with. Indeed, as this is the month in which the greatest number of Moths appear, it may be as well to mention in this place a plan for the capture of the nocturnal Lepidoptera, which has recently been adopted by our collectors with the greatest success. It simply consists in daubing the trunks of trees, immediately after sunset, with coarse sugar moistened with water. The Moths, especially if the weather be still and the air charged with electricity, are attracted to the trees, where they feast on the sweets to such an excess, that, on applying a lamp (a bull's-eyed one is best) in the dark, they may be secured without attempting to fly off.

Owing to the vast number of species now to be captured in the winged state, we have not thought it advisable to continue the list of species hitherto given, which would extend to far too great a length for our pages. J. O. W.

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* *Not* M. bracteata.

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