

potted some Azaleas with the pure material, and instead of being old refuse as in the previous year, it was new. The plants languished and died, still I do not blame the refuse for this, but my own imprudence. An Azalea has a close ball, so by potting in loose refuse, crammed in too, the water passes through it without wetting the ball at all: the consequence is, that the roots are dried-up, and when they are gone the plant goes also. This was a hazardous experiment, certainly, but the plants were doomed to be thrown out, for they were too large for our small houses.

Others have been in an equal dilemma with myself, and although giving their vote for the refuse as a first-rate material for Ferns, Begonias, Gloxinias, &c., they prefer peat for hardwooded plants.

A florist who grows Camellias well had a few sickly plants, and he, fingering my refuse dust, ordered twelve bags; so when the parties just mentioned remonstrated against my recommending the refuse for Camellias, I went to see what he had made with his twelve bags.

"How do you like it?" "Very well." "That's strange," exclaimed I; "I had two gardeners from H— last week, and they do not like it." "But, I do," rejoined the florist, "and I have been to the Midland station to see what they will bring a truck for." This was proof enough. My friend liked it, and stepping into his greenhouse he took me to a lot of young Camellias, only grafted last year, growing in the infallible refuse dust. Some were in flower, and I in a quizzing way said they were nothing extra. "Nothing extra!" said he indignantly; "look at the size and bright green of their foliage, the brightness of the colours of the flowers, their size, and feel for yourself the stoutness of the petals," all the while holding the flower in his hand between his fingers; "and," continued he "where will you find a better-formed flower?" The points were incontestible: therefore I simply said "it was an exception." "An exception!" quoth he; "but look here, in an adjoining house, for growth on my two-year-olds, none of your three-inch shoots, but a six-year-old plant in two years." That was enough; he had tried the refuse, and had become an enthusiastic lover thereof. He uses it, half loam, half refuse, with a good admixture of silver sand, or about one-sixth of the whole. He says, and his plants bear testimony to the fact, that it is good material for Acacias, Azaleas, Camellias, and anything requiring peat soil or leaf mould. He puts his bedding plants in with a sprinkling of the refuse; but he does not place an Azalea with a ball as hard as a turnpike road in the pure refuse as I did, but uses half loam and refuse, and gives the whole a sprinkling of sand, which is very different from potting in the rough refuse.

I tried what effect it would have on Rhododendrons; but as they grow so luxuriantly here, though the soil is a strong loam, the difference was not great, though decidedly in favour of the refuse.

Some one, Mr. Beaton, I think, hinted that the refuse would be a good compost for Melons. Unfortunately, I had not a frame at liberty, but in the first week in July I planted two plants of the American Ridge, one in a bushel of refuse, the other in loam, and two of Achapenorricher Melon in a similar manner, and treated them alike. Both set their fruit immediately, and as the season was far advanced a couple of fruits were only left on each plant. The American in refuse gave a Melon, large, deep green, changing to yellowish-green when ripe; flesh red; flavour poor, but late Melons are not over-well-flavoured in general, slightly netted; shape of fruit elliptical; weight of each fruit from the plant in the refuse, 1½ lbs., and 3 lbs. 6 ozs. respectively. The plants in ordinary soil gave smaller Melons but of better flavour, the weight being 1 lb. 7 ozs., and 1 lb. 12 ozs. Achapenorricher in refuse afforded a Green-fleshed Melon, the rind netted and warted, spherical in shape, of a moderate flavour, flesh thick but melting, and rind no less thick. The fruits weighed 1 lb. 14 ozs., and 1 lb. 7 ozs. In common soil the fruits weighed respectively, 15 ozs., and 1 lb. 4 ozs.

My master, who is partial to Melons, pronounced these new kinds of Ridge Melons flavourless Pumpkins; but he cannot appreciate (and he is a judge), any other Melons than Scarlet Gem, Excelsior, Beechwood, and Egyptian. The Persian breeds, however, are equally good. The smaller the Melon the better the flavour, and the larger they are the more sugar is needed to season them.

A few handfuls of refuse sprinkled on the meadow made people inquire the reason of the place being different from the rest, and it shows itself now. It would be a good dressing for mossy-bottomed lawns.

Potatoes do well in it, and give an increase of weight over ordinary manure. From a nine-yard row of each the weight was—of manured Potatoes, 2 st. 8 lbs., and from the refuse dusted, 3 st. 4 lbs.

The rough refuse fibre appears to be a good substitute for peat for Orchids; but as I have not tried it with more than a dozen plants or so, and as I intend to test that material this season, I cannot speak decidedly. However, the results already attained are very gratifying.

In conclusion, I beg to tender my thanks to those who first proved the merits of the refuse dust, and more especially to those who made known the material, thereby placing in the hands of the small gardener and amateur a substitute for the not-always-comeatable ingredient peat, and even when it is to be had, not always of a suitable composition. Through writing to THE JOURNAL OF HORTICULTURE, my time has been seriously encroached on by private communications, and as this is inconvenient to me, I purpose, but reluctantly, to become an unlocated correspondent of this Journal: therefore, good readers and correspondents farewell.—G. A.

AERIAL ROOTS ON FRONTIGNAN AND CONSTANTIA VINES.

VINE-STEM INARCHING.

SOME Frontignan and Purple Constantia Grapes, which I have in the same house with Grapes of other varieties, begin at a certain stage to emit aerial roots, which dry-up, as the house is kept dry to ripen the crops, and the fruit becomes worthless. As this is not the case with other Vines (St. Peter's, Black Hamburgs, &c.) in the same house, it is evidently not owing to mismanagement inside the house; but, in all probability, the outside border should be of a different soil for Frontignan Grapes—perhaps of a hotter and drier nature. I should, therefore, be glad to know whether, if they were in a border by themselves and with a third or fourth of sand or gravel, you think they would answer better, though the soil should lose in richness? The present border is of the common description, as recommended for growing Vines, and is covered in the winter by tiles in order to protect it from wet.

Would you also inform me whether it would be difficult to inarch the stem of a Vine, about ten years old, low down? as, by this means, the pot with the young Vine to be inarched upon it could rest upon the floor of the house. The proper and best plan would be, I suppose, to inarch upon young wood; but the former, if feasible, would be the more convenient.—AN AMATEUR.

[You will help your Vines by pulling-off the aerial roots as they appear, which will force them to root in the border; then dig a drain or a deep well opposite them in the border, and work in some lime rubbish. If that does not have the desired effect, then raise the roots next autumn; at the end of September replant in fresh soil, of which lime rubbish may constitute a third. We should use that, broken bricks, and charcoal; but not sand or gravel.]

As to Vine-inarching, you may either inarch or graft before the sap is in motion; after that you can graft with a dormant scion after the leaves of the stock are expanded. The inarching in the growing period is most easily done when both are growing as you state. See "Doings of the Last Week."]

ORCHID CULTIVATION, CROSS-BREEDING, AND HYBRIDISING.

THERE has been for the last few years a steady and unabating increase in the ranks of Orchid amateurs all over the country. Gentlemen of wealth, not only in England, which once reigned supreme in this respect, but also in Scotland and in Ireland, have devoted large sums in founding, and adding to, collections remarkable for their individual and intrinsic beauty; and all of them possessing an interest which we may look for in vain in any other of the great divisions of plants. To the great body of the people the allocating such large sums for, in many instances, such small commodities seems inexplicable and anomalous; but to those who have cultivated a taste for flowers, and who are accustomed to see the greater portion of the choicer subjects of Flora under cultivation, this division possesses an interest, both individually and collectively, such as to warrant any reasonable expenditure. Besides, it is well known that skilfully-managed

collections, remarkable for their rarity and beauty, are always growing into money, so that, commercially speaking, the sinking of such money is a profitable investment.

Superiority of cultivation, then, seeing that it is about a quarter of a century since the mode of growing them and classifying them into divisions and subdivisions became better understood, ought to be a marked feature in their history; for there has been no want, either of men to experimentalise and find out the best methods for promoting their growth and encouraging floral development, or means to carry out their views. It is very questionable, however, if the truth were known, how far we have upon the whole gained in this respect. Eight years ago, when the writer sojourned in the metropolis, Orchids were in better condition, evincing somewhat more superiority of culture than we can boast of at the present day; at least, judging from what was exhibited then in comparison with what was exhibited last season. This is a somewhat bold assertion, but it seemed to be the opinion of more than one, and of some of the exhibitors themselves. There are some private collections around London that are a credit both to the gentlemen that own them, and to the gardeners who superintend their management; but numbers of these are holding aloof from sending their plants to the exhibitions, and this branch of horticulture is not so strongly represented before the public as it actually is entitled to be.

It has been remarked with a certain degree of truth that Orchids are not difficult to cultivate. This remark holds good with everything else, only one requires to know and adopt the right method. A first-rate Orchid-grower, however, must be exceedingly attentive and vigilant, taking cognizance of their peculiar habits, in order to fall upon the best plan for accelerating and consolidating growth; so as, in the one instance, to make them proof against disease, and in the other to promote good flower-spikes, and flowers large and full of substance. This is a task far more difficult to accomplish than many would suppose, for it is one thing to have a collection that may be considered fairly grown, and another thing to have one coming up to the superlative style of merit. There is the temperature best suited to the constitution of the plant; there is the material for the promotion of root-action; there is the quantity of moisture that each and all require, and the time when it should be applied—all these matters demand more than a passing glance, or an off-hand dealing with, if it be wished to rise beyond mediocrity; and yet you will not find half a dozen men that adopt precisely the same method, and all, probably, are successful to a certain degree.

Some, for instance, grow *Phalænopsis* on blocks of wood without any foreign matter whatever; others grow them in pots, the predominating compost being charcoal and manure, which is about as diverse treatment as it is possible to conceive. They grow and root splendidly in the latter compost, if a little sphagnum is chopped up amongst it; but it requires a skilful hand to water them, and they must not be overwatered upon any consideration in such a compost, else the roots are presented with more moisture than they can absorb; and hence elongation ceases, their pores are choked, and they gradually rot away; their leaves of course suffering in proportion. But, more than that, such gross feeding subjects them to the very evil which was recommended to be guarded against—disease; and, when once these rare and fine plants are contaminated, it requires time to produce a remedial effect. But to go into this thoroughly, and discuss it as it ought to be discussed, would require a series of papers, for this whole Orchid-cultivation question admits of a more thorough investigation than what has yet been accorded it, for the sake of horticulture generally, and more particularly for the benefit of numbers who have begun founding a collection, and who, feeling their way step by step, are anxious to obtain reliable information in ascending the scale.

There is one peculiar incident in the seeding of Orchids which is sufficiently anomalous to be worthy placing on record; and if it should meet the eye of Mr. Darwin, I should be glad to know if any like occurrence has come under his investigation, and the conclusions deducible therefrom. There are in our collection a plant of *Cattleya crispa* and one of *Dendrobium cretaceum* that produced, in each instance, abortive flowers. The buds swelled and inflated themselves to a certain extent, but were unable to expand their sepals and petals, and I supposed at the time they would fall off and die. Not so, however. The foot-stalks began to assume a more healthy green, and gradually swelled and produced seed-vessels, so far as exterior appearance went as perfect as those that had flowered in the regular way.

This appeared to me all the more strange, for the organs of fructification were enveloped all the time by these sepals and petals, so that no insect or other agency could in the least affect them. I cut up the *Cattleya* when ripe, and it was full of the fine white chaff-like dust common to the whole genus. The *Dendrobium cretaceum* pods still hang on the plant.

Again, I have observed over and over again that flowers of an imperfect character, such, for example, as those wanting a petal or sepal, have a great tendency to go off to seed-pods; for Mr. Darwin correctly remarks that so soon as a flower is fructified the ornamental portion of it immediately fades, and the nutriment is absorbed by the organs of fructification.

But I have also had pods without the least manipulation from perfect flowers, and have tried them in various ways, in order to get what I believe to be the seed to germinate, all to no purpose. Mr. Gorse, of Sandhurst, Torquay, an enthusiast in all such matters, seeing a short article of mine in a previous Journal respecting the seeding of Orchids, wrote to me to know how I had succeeded in my various experiments. I replied privately to that note, and enclosed a packet of *Odontoglossum grande*, which brought forth the following reply:—

"I am much obliged for your polite note, and for the packet of seed of *Odontoglossum* which is enclosed. It was very kind of you to send it, though, after your failure, I should have had little hope of succeeding. But, my dear sir, the seed is barren. On careful examination with one of Powell's microscopes, with a power of 300 diameters, I cannot discover a single seed which contains an embryo. There is the long, loose seed-coat, ribbed and twisted, which ought to hold a naked embryo, as a minute opaque dot somewhere in its interior; but in no single example was the embryo seen, though the transparent tissue of the seed-coat would readily have allowed it to be seen if present. Probably your plants were not properly, not really, impregnated. I think Darwin has touched the real spring of the general failure of Orchids to produce seed with us. He has shown that no Orchid blossom is self-impregnating, that the pollen of one flower fertilises another, and that this is effected almost universally by means of insects, chiefly bees. But the ventilation of our Orchid-houses is so managed that few flower-probing insects find their way into them. I am myself only a beginner in Orchid-culture, and that on a small scale; but for you, or any other clever man who has a large supply of Orchids at command, I do not doubt that a promising field of experiment is open. If I had such an opportunity I would encourage the access of bees to my plants in flower by all means; and even catch bees of different species—honey bees, wild bees, humble bees from the garden and field—and turn them loose in the Orchid-houses. Thus I think you would get many flowers impregnated and have fertile seed in abundance. Veitch's successes are all hybrids; in these cases the impregnation was done by human hands, and of course was effectual."

Well, I thought this letter, which I received last October, was most interesting, and, what with this and Mr. Darwin's theory and experiments together, I set earnestly to work. In the first place I determined to experiment upon a *Phalænopsis amabilis*, crossed with the more delicate and pretty rosea, thinking if I could but be successful it would be so much gain in the right direction. I took off the hood or capsule that covers the stamens—and really one cannot help wondering how each component part is fitted to one another—with the point of a budding-knife, and the gummy substance that holds the stamens to their position in the flower (for it is only an appendage, and can be taken off without the least scratch to the column), stuck fast to my knife in the same way as I presume it will stick to the insects in Java or the Philippine Islands, and to my delight I could carry it up and down the house *ad libitum*, or could even send it with the utmost safety to your office in Fleet Street, or to the laboratories of Messrs. Darwin and Gosse, so as to be fit for duty after arrival. I applied this to the pistil of *amabilis* with much earnestness and care, and have now a very fine seed-pod as the result.

Vanda tricolor was served in the same way with *Vanda insignis*, and with the same results; *Cattleya labiata* with a chance flower which came from *C. crispa*; *Oncidium Phillipsianum* with *O. leucochilum*; and some others, all with success. I was, of course, very much pleased so far, and I am very anxious to know whether I will be able to make them germinate. That point of the experiment yet remains to be tested, and I shall take an opportunity hereafter, if spared, to record the results.

About a month ago I crossed *Phalænopsis Schilleriana* with the new Bornean variety, and have a splendid seed-pod as the result of that experiment. There are several varieties of *Schilleriana*, some producing flowers much more perfect than others, and varying in shades of colour. Some, too, are much closer arranged on the spike, and show at once the correctness of the enunciation that a plant scarcely ever reproduces an exact likeness of itself.

The Bornean variety is much the best of all the grandiflora breed. Its flowers are larger, of greater substance, and of inimitable purity of white. Its form is as good as *amabilis*, both sepals and petals being larger and more full, and the flowers are so closely arranged on the spike, although not confused, as to give it a very formidable appearance. Its only damaging point is, that the edges have a tendency to turn back; and this, in a florist's point of view, somewhat mars its individual beauty.

To return to the experiments. I was curious to try my hand at hybridising; and having a nice plant, with a couple of fine flowers on it, of *Paphinia cristata*, I fixed upon trying to cross it with one of its terrestrial congeners—*Calanthe vestita*. In this I was also successful, for a fine pod hangs on the plant as a voucher thereto. I also hybridised *Limatodes rosea* with this same *Calanthe*, which has been done beforetime, I understand, with success, so that I did not value this hybrid so much. The pod of this is now ripe, and I will be enabled to enter into the second, and, to my thinking, most difficult part of the experiment.

Now, in conclusion, there are two points that I should like the scientific pen of Mr. Darwin to throw some light upon; and that is, Why these abortive flowers produce seed-pods to all outward appearance as perfect as those that have been impregnated? And why those flowers that never expanded, whose organs of fructification never were under the influence of light and atmosphere in the same way as other perfect flowers are, produced seed-pods at all?—JAMES ANDERSON, *Meadow Bank, Uddingstone.*

GALVANIC PROTECTOR FOR KEEPING SNAILS, SLUGS, &c., OFF FLOWER-BEDS.

PROFESSOR William Thompson recently, before proceeding to the regular business of the natural philosophy class in Glasgow University, said that a very curious application of Sulzer's experiment had been made known to him. This experiment, as they were already aware, was:—When a piece of copper or silver and a piece of zinc are placed one above and the other below the tongue, and then put in metallic contact with each other, either by direct contact between them, or by wires connected with them, and put with their ends in contact at any distance, an electric current was produced and felt in the tongue, this organ acting as an electrolytic conductor. He had great pleasure in bringing before them a practical application of this experiment for the purpose of protecting flower-beds from the inroads of snails, slugs, and other kinds of creeping creatures. He had not, indeed, seen it; but he had been assured of its success. The way to apply the experiment was as follows:—A zinc plate, the upper edge of which was bound with copper, and elevated 2 or 3 inches from the ground, was so placed as to encircle the plot of ground which was to be protected. When any creeping thing, attempting to get over this little wall, came in contact with the zinc and the copper, it experienced an electric shock; indeed, it could not be an instant in any position touching the two metals at once without such a result taking place. The question now to be solved was, whether the snail, slug, toad, or frog would be so sensitive as to be deterred and struck back by the amount of the shock which it received under these circumstances. Mr. George Edgar, who was the inventor of this remarkable application, had assured him that he had tried the experiment with leeches, and that it succeeded perfectly. Mr. Edgar was present and had brought what was necessary to test the application.

Mr. Edgar then came forward and made experiments before the class. He placed leeches both inside and outside a part of the table enclosed by a zinc wall with copper mountings. When the leeches crept so far up the plate that their bodies touched both the zinc and the copper, they experienced an electric shock, and fell backwards.

Professor Thompson remarked that Mr. Edgar had tried the experiment with snails and slugs, and found they were more

sensitive to the shock than leeches. As he had already remarked, the question to be solved was whether the creatures were strong enough to persevere in getting over the wall, notwithstanding the shocks they invariably received. He might add that it was not necessary that the bottom of the plate should be buried in the earth, as it was enough if the plate was so placed in the ground that the creatures whose inroads were to be prevented could not get under it. To prevent the zinc plate from oxidising by damp, &c., the lower part of it might be protected by a coating of paint, pitch, or some similar substance. Indeed, the plate might be completely insulated from the earth, all that was necessary for the electric effect desired being, as he had stated, zinc and copper in metallic connection with one another, so placed that the marauder could not get into the guarded precincts without touching the two metals simultaneously. Of course, if the zinc is well polished, the shock given is greater than with a tarnished zinc surface. If, therefore, this plan of protecting flower-beds and other plots of ground produced all the results which were desired and anticipated, it was possible enough that one of the duties of a gardener in a morning would be to go about and polish his zinc and copper enamel guard.

[This is no novelty. It was invented by Mr. W. Walker of Hull, and communicated by him to the Society of Arts as long ago as 1839. A full description with illustrative drawings are in Loudon's "Gardener's Magazine" for 1841, showing how it is adapted to flower-pots and other garden uses. The metals becoming oxidised, and then ceasing to galvanise, require often to be rubbed bright with sand-paper, and this trouble has caused their disuse. Two or more makers advertised these plant-protectors at 14s. per dozen in the periodicals of 1841.—EDS. J. OF H.]

ARRANGEMENT OF TURF IN FORMING A GARDEN.

GRASS lawns are such indispensable features in modern gardens that few, if any, can be said to be complete without them. Sometimes a broad sweep of lawn is made the principal feature; but more frequently grass forms the groundwork to set off others, and well it is adapted to the purpose.

The time is at hand when lawns will give unmistakeable signs that they require attention, that the scythe and the mowing machine must be set to work to keep them in order. This also is the time when many small gardens are laid out or altered; and as, more or less, grass enters into the composition of all, or nearly all, of them, a word on the subject may not be inappropriate.

It cannot but have struck many working gardeners that where anything has been attempted beyond the ordinary level grass plat and grass verge one important point has been entirely overlooked, or at least not sufficiently taken into consideration, and that is the time and expense necessary to keep it in proper order during the growing season. Large quantities of turf are laid in such a manner that neither scythe nor machine can be used on it. It is formed into such sharp angles, both horizontally and vertically, so thickly planted with shrubs, &c., or roots and rocks form such intricate passages, that nothing but the small hand-shears can be used to cut it, and this, it is well known, is a very slow method of grass-cutting.

I once knew an instance where a gentleman, who had an eye to the fanciful in gardening, had his garden laid out in such a manner that, although nearly half of it was turf, there was scarcely a part where anything but the shears could be used on it. It looked very well while the grass was inactive, but when the growing season arrived it was found that the ordinary labour was not sufficient by two-thirds to keep the garden in order; and as he had not calculated on the additional expense of employing another man merely to clip the grass, he found that he had committed a grand error, for of all things that tend to make a garden unattractive nothing is more effectual than neglected turf, and that still more so when formed into steep banks, narrow windings, and fanciful edgings.

In very small gardens which take less time to manage, such intricacies of turf may be excusable, as it can be more easily controlled; but even here some consideration ought to be given to the time that can be spared during the summer for keeping it close and neat, as, where this can be done, some of the prettiest effects can be produced by a well-planned mixture of turf, shrubs, and flower-beds.