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the straw will be quite clean and free from smell. It then forms an excellent safeguard against heavy rain dashing grit over the fruit, a thing much to be guarded against. I have found this plan much better than that of using clean straw or short grass, but if plenty of liquid manure can be had the case would be altered.

Mr. Braithwaite, of Weymouth, once sent me a cask of schist, a bituminous earth; I tried it and found the effect excellent upon young cucumbers, melons, potatoes, strawberries, and indeed upon plants in general.

I may add, in conclusion, that the runners from pot plants always bear a week earlier than those from plants that have never been in pots.

The above is my plan of treating this fine fruit, so universally grown and liked, but which, I believe, I should be justified in saying has been more roughly treated than any other plant, except, perhaps, the potato; and this too in places where better things might have been expected. It is only a year since persons were advocating, in the Gardening Periodicals, the barbarous system of mowing down the leaves, the consequence of which is a new growth of the plant, too late in the autumn to form buds for the next year's crop, not to speak of the drain on the system of the plants that takes place in consequence of the operation. Such a proceeding must be the result of experimenting without thought or purpose, and it would be much better to leave Nature alone than interfere with her in such a way.

Sound cultivation can only be founded on observation of the natural tendencies of plants, so that by artificial means we may favour their unfolding in the particular direction we require. Thus we lead Nature to furnish us with products which, under common conditions, are not developed, and this without injury to the plants; but all attempts to *force* the production of particular results, in opposition to natural tendencies, must either fail or be accompanied with the destruction of the health of the subject.

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## XIX.— *On Amaryllids.* By D. Beaton, gardener to Sir William Middleton, Bart., Shrubland Park, Ipswich.

(Communicated Dec. 11, 1849.)

When the late Dean of Manchester had split up into fragments the mass of bulbous plants which formerly passed as species of Amaryllis, and divided them into separate genera, which he distributed into the different sections of the order, I well remember the discontent and heartburnings which obtained among many

of our best bulb growers with his arrangement, and these lamentations forced strongly upon the mind the different ideas of utility entertained by botanists and mere gardeners. The arrangement was certainly not very flattering to those who would "let well alone," and yet it was so mysterious to the grumblers that they feared to show their opposition to it in public print. How I came to know how the tide ran was by mere chance. Mr. Loudon sent an early copy of the Amaryllidaceæ to me in the end of April, 1837, with a request that I would write a notice of it for the Gardener's Magazine, to be in time with it for the next June Number, which I did, and for which I was thought a fair target for the shafts of the grumblers, having spoken favourably of the work. I thus became aware of how far honest men differed from the author and from each other on the arrangement of Amaryllids. I was asked over and over again what difference could be found between a Hippeastrum and an Amaryllis, or between a Pancratium and a Hymenocallis, and what affinity there could be between a Vallota and a Cyrtanthus to warrant their alliance so closely in this new arrangement. Looking at Vallota and Cyrtanthus with a gardener's eye, it does seem strange that plants so dissimilar in their outward forms should still be related botanically—the Vallota being to all appearance a true Amaryllis, while the Cyrtanthus looks as if it rather belonged to the section in which Clivia and Coburgia are found—Phædranassa was not then established. But the Dean, who had a wonderful insight into the true affinity of bulbs, thought otherwise, and instead of following those who took a gardening view of the subject, or of drawing a mistaken comparison between Clivia, alias Imatophyllum, and Cyrtanthus, to which Clivia has no true affinity, divided them into hollow and solid-scaped sections, and he afterwards asserted from his own experience that a plant from either section could no more cross with any plant in the other section than it could with an Oak tree; and thus in his arrangement Vallota is placed side by side with Cyrtanthus on account of their flowers being borne on a pipy stalk or hollow scape, while the Cyrtanthus-like flowers of Coburgia and Clivia availed nothing in his eyes, as these flowers are produced on solid stalks, and he placed a host of other plants between them in the two sections thus distinguished. Nevertheless in his intercourse with gardeners he wished them not to give up any point on which they might differ from him in this arrangement until they proved it by repeated experiments with the pollen, and for the last ten years of his life he allowed a great latitude of correspondence to the writer of this article with respect to such experiments, and was always willing to suggest the most likely mode of conducting them.

Some years since he seemed quite positive about the impossibility of obtaining a cross between a Pancratium and Hymenocallis, although it is very difficult to point out any distinction between some species of the two families, in the absence of the seeds—on the diversity of which he founded his argument against their union—that of Hymenocallis being as green and fleshy as a pea, and in some cases as large as horse beans, while those of Pancratium are invariably black and shelly. Now this is as near as possible the only difference between the seeds of Clivia and those of Cyrtanthus, and it is well known that the Dean had latterly some misgivings as to the value of this distinction between Hymenocallis and Pancratium, for he avowed as much in this Journal in 1847. Therefore if it should turn out that a Pancratium will breed with Hymenocallis, are we to infer that a Cyrtanthus will cross with Clivia? I fear not: the insurmountable barrier in the difference of the flower scapes still intervenes —a feature, as we have already seen, which renders a Clivia as unfit to cross with a Cyrtanthus "as with an Oak," although the two individuals look as much alike as if they were twins, while Cyrtanthus has crossed freely with the Vallota, with which it has hardly one point of outward resemblance; but I believe it will be found that their seeds are very similar, and they agree in having a pipy stalk like the Hippeasters.

I have laid the foundation for crossing the Cyrtanthus by the pollen of Vallota some years since at the request of Dean Herbert. In 1845 I sent three curious new bulbs to him which were received here from Captain G. Broke, R.N., from Algoa, and he requested particularly that I would procure some flowering bulbs of either of the evergreen Cyrtanthi fresh from their native soil through Captain Broke, alleging as a reason that he was anxious to see if I could effect a cross between them and the Vallota, and that there was more certainty in our being able to flower a fresh specimen than those we already possessed, after they had stood a long time in pots with little disposition to bloom: accordingly a couple of fine bulbs were here in due time, not as I wished them, however, for I sent out instructions to have as many of their old roots saved as possible—always a good provision in the case of such bulbs as are known to be shy bloomers with us—but the commission was entrusted to a Cape Town seedsman, and these collectors never think of looking after the roots of such bulbs as they gather and offer for sale, and no roots arrived with the Cyrtanthus bulbs, but after two full seasons' growth one of them flowered last July, being the third season after potting. The treatment was suggested by the Dean, and may be stated thus:—The two bulbs were potted in pure yellow loam, considerably reduced with sand, in upright pots not

wider at the mouth than to allow half an inch space between them and the bulbs, which were covered up to the neck; that being the safest way to protect pot bulbs from the effects of the variable atmosphere of our plant-houses. They were then plunged in a brisk bottom heat, but no water was given till the leaves were about 3 inches long and roots began to appear through the ball, when they were removed to a cool and more airy place. This was late in the summer of 1846, which for heat and light was not much behind a South African summer, and the following summer of 1847 was also favourable to the growth of these bulbs. During summer they were kept in an airy greenhouse and watered freely, and by the beginning of September they were removed to a front shelf in a late vinery, where a constant draught of air passed over them day and night whenever the weather permitted, and where the glass was seldom lower than 60°, with a very dry atmosphere. They stood here till the grapes were all cut in January, and the house was allowed to cool down to near the freezing point, and all this time they received very little water. They were then removed to the cool end of a stove, where they remained till late in April, and afterwards they were taken to the greenhouse. I believe a dry atmosphere, abundance of air, and a temperature of about 50° to 55°, are necessary to these evergreen Cyrtanthi from September to May. One of these two bulbs produced 11 fine flowers, red, orange, and green, and the scape was 2 feet 11 inches long, seven inches of which being made after the plant had done flowering—a circumstance I do not recollect having ever seen in any other bulb; but a change of temperature might have caused it, for the plant was removed to a closer house, though not hotter, than where it flowered. Four of the flowers were dusted with their own pollen, and four with the mixed pollen of the two varieties of Vallota purpurea; the rest were cut off to ripen the pollen for future use. In about ten days I began to tremble at the issue of the experiment. On the seventh or eighth day after the flowers were dusted, those which received their own pollen slackened their growth and ultimately perished; those which were crossed with Vallota held on. I took every known precaution, and I do not believe that I can be deceived in the cross. The pollen was extracted long before it was fit for use. Every alternate flower was dusted with one kind of pollen, and a coloured string then tied to each—the colour of the string and the name of the pollen plant was marked in my memorandum book before the other pollen was applied to the rest of the flowers.

Now, although I have taken every possible precaution to secure this experiment free from error, I confess I should have

looked on it as a total failure as soon as I perceived the falling off of those flowers that were dusted with their own pollen, had I not been aware that a similar circumstance was quite familiar to Dean Herbert in Hippeastrum—a family next door to Cyrtanthus. He said he could cause any Hippeastrum to cast its seed-pods that were fertilised by its own pollen, by introducing the pollen of a neighbouring species to the rest of the umbel, and yet I have failed in many instances to prove this freak in all the Hippeastrums that I cultivate. But that there should be no room for mistake, I requested Dr. Lindley to take charge of one of the seed-pods, and see that the seedlings from it should be properly attended to, in case that I should meet with some unforeseen accident or bad luck in nursing the rest. The seeds began to sprout in the three pods which I kept before the pods bursted, so that we are sure of their vitality.* Three flowers of the Vallota purpurea were dusted with the pollen of Cyrtanthus obliquus at the same time, but, before the week was out, this experiment was sealed, at least for this season; and I mention it merely to "show cause" why I do not follow out such experiments of this nature as are sometimes recommended, as some wise people think that gardeners in large places can do anything, and especially be able to carry out their own hobbies. Our case is often the reverse of this.

A correspondent to the 'Gardener's Chronicle,' who signed himself "Mucklewell," very kindly sent me some of his Vallota pollen for this experiment, for which I feel very much obliged to him, and also to Mr. Leach, Clapham Park, for pollen of his three beautiful Brunsvigias which he exhibited before the Society last autumn. I dusted a score of flowers of the Amaryllis Belladonna with the pollen of the Brunsvigias, and as many with their own pollen, but the whole refused to seed; it was probably too late in the season for them to seed, being the very end of September, and they were in the open border.

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* [The seeds here alluded to have grown, and have produced about a dozen young plants, with long, linear, somewhat glaucous, blunt, curved, deep-green leaves. But at present no opinion can be formed of what they will eventually become. The curvature and slight bloom may possibly be derived from the oblique Cyrtanth (*Cyrtanthus obliquus*), but the habit is more that of a Vallote.]