

THE CACTUS JOURNAL

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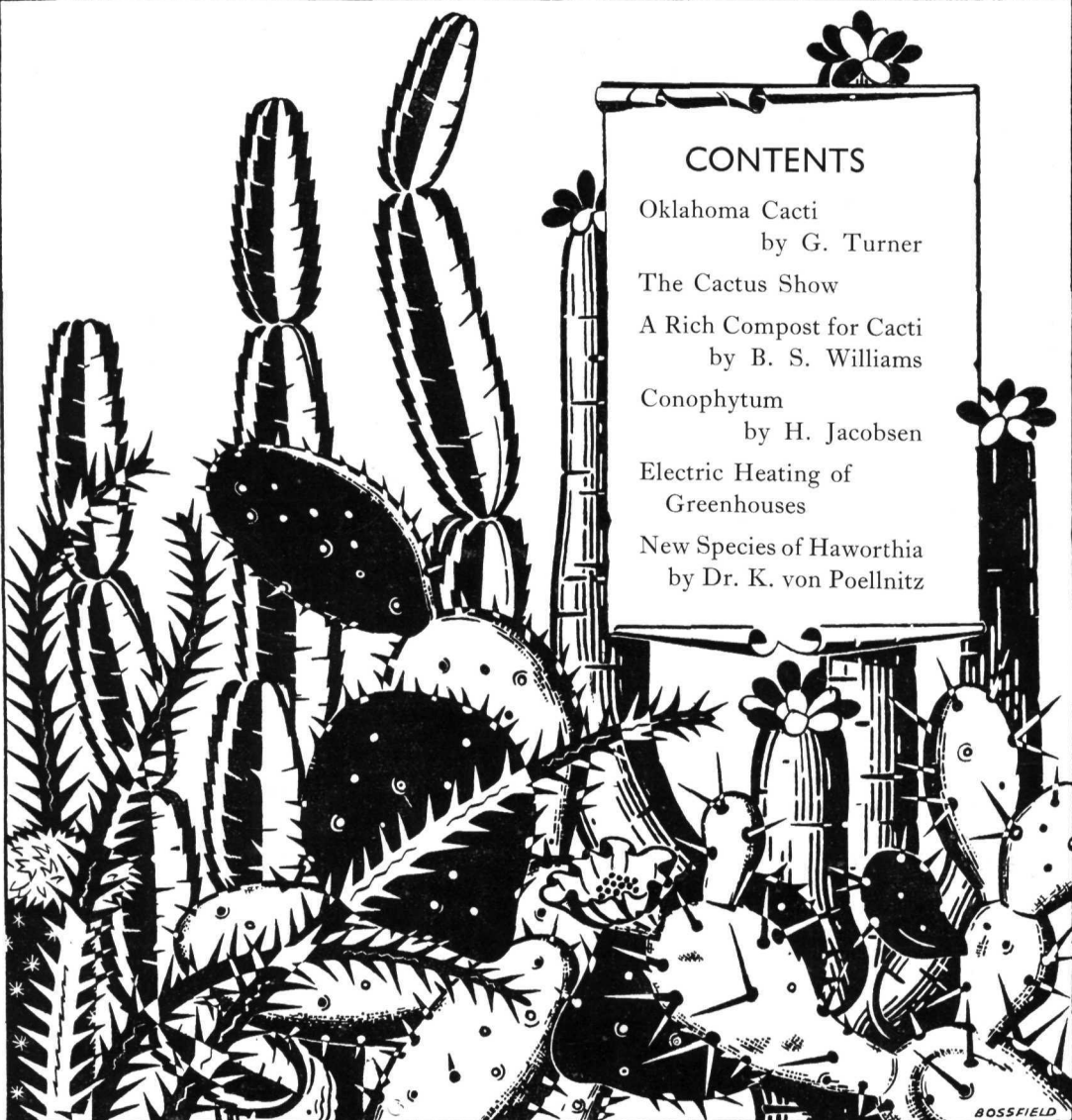
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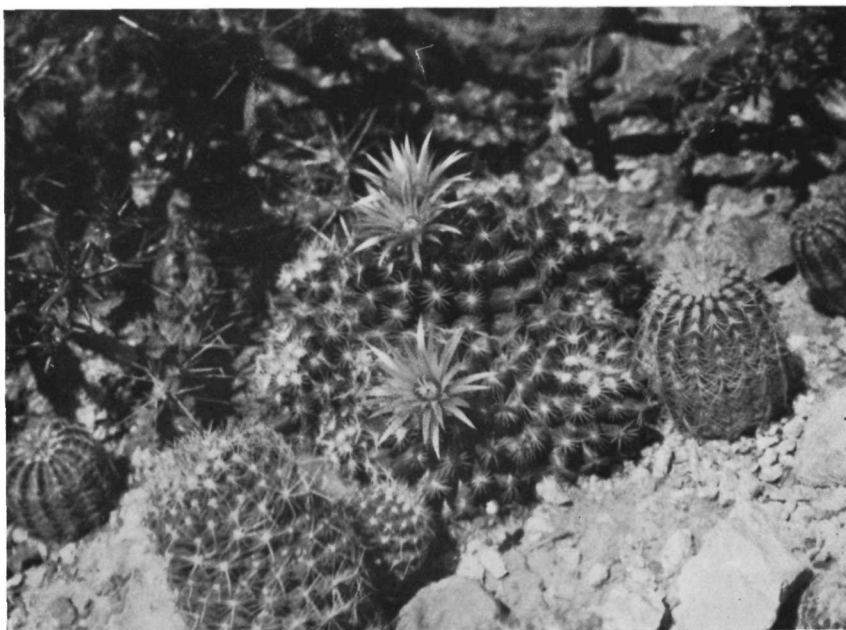
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Neobesseya missouriensis.

Oklahoma Cacti

By G. Turner

IN the June issue of the *Cactus Journal*, the omission of a little word made a big difference. Paragraph 4, page 81, should read: "They are *not* found in large numbers." As a matter of fact, less than half-a-dozen plants of several of the new species have been found true to type. There are many variations from the type not sufficiently distinct to be classified as new species; they are known as variations and call for careful study by the botanist.

One variation of *Echinocereus oklahomensis* Lahman which was previously described as

barrel-shaped, grey to white with partially pectinate spines, is round and obese, depressed in the centre, with long, curved, copper-coloured spines which almost completely cover the plant body.

Other species of *Echinocereus* found include *E. caespitosa*, *E. perbella* and *E. pectinata*; these are also found in Mexico and Texas. The outstanding feature about the Oklahoma species is, they are all extremely floriferous. I have grown many varieties from Mexico and Texas but never succeeded in flowering any of them. I believe we do not understand

the conditions necessary for their correct cultivation. Last winter I lost three nice plants because they were left too near the glass during a frosty night. The Oklahoma natives would take no harm if left out of doors covered with snow. They could be grown out of doors all the year round in places where the atmosphere is drier than in Surrey. Too much dampness in winter will kill any Cactus.

Besides the Echinocerei described, there are a number of beautiful, large-flowering Coryphanthas, the latest of these being *Coryphantha columnaris* Lahman. The description is: plant cylindrical, narrowed at the base, depressed at apex, 16–18 cm. high, 6 cm. in diameter; tubercles slender, 10–12 mm. long; spines various, 5–15 mm. long; radials 10–18, white with brown tips, centrals 4, light brown, one stout, porrect, 10 mm., the upper three smaller, deflexed. Flowers several clustered at the apex, 6–7 cm. long, hypanthium smooth; inner petals linear, magenta with hyaline margins; outer paler, greenish straw-coloured. Anthers orange. Stigmas 8, white without, pink within. Blooms in July, a truly gorgeous flower. Fruit smooth, pale green berry; seeds light brown. The type plant was found in Jackson County, Oklahoma, at an altitude of 600 ft. The type specimen is in the Missouri Botanical Gardens.

Coryphantha radiosa is found in the extreme north-west corner of the State, at an altitude of 4,500 ft. It is solitary and bears one single flower at the apex, and blooms in May. The flower opens into a many-pointed star, bright magenta in colour, and the fruit is an oblong green berry.

Coryphantha vivipara is frequently found in south-western Oklahoma. It is the smallest and—excepting *C. columnaris*—the finest spined. The spines are white at the base and brown or black at the outer ends. The flowers are delicate purple-pink with silvery outer segments, the stigmas short, mucronate and magenta in colour. It is also found in New Mexico.

Coryphantha neomexicana is found in south-west Oklahoma. In spring it is crowned with numerous magenta flowers that do not open flat. Old plants are inclined to be cone-shaped and may be 7–8 cm. high. A three-years old plant is the size and shape of a half-inch marble. It is also found in New Mexico.

Of the genus *Neobesseyia*, three species are found. The best known is *N. missouriensis*, discovered by Nuttall in 1818 on the upper reaches of the Missouri River, hence the name.

It is native throughout the State and specimens are numerous in the north-east. The fine radial spines are white, the centrals few, the flowers greenish straw-coloured, changing to palest yellow. The filaments twisted into a salmon-pink ball that casts a pinkish glow in the throat of the flower. The fruit is a crimson, globose berry.

Neobesseyia similis (Engelmann) Br. & R. is described as being a most elusive species, reported in one place or another but seldom authenticated; about four specimens have been found. The crowns are much smaller and more confluent than those of *N. missouriensis*, for which it is sometimes mistaken, but there is no mistaking the flowers which are a delicate mauve with fewer, broader petals.

The descriptions of two new species of *Neobesseyia*, native to Oklahoma, will be available shortly and published by Marion Sherwood Lahman. They are *N. rosiflora* and *N. Wissmannii*; both are very rare and specimens have not yet reached me.

Opuntias are very numerous here, as might be anticipated. There are seventeen species known, divided into two sub-genera, *Cylindropuntia* Br. & R. and *Platyopuntia* Br. & R., the latter being commonly called Prickly Pear and having flattened pads.

Of the first sub-genus, *O. imbricata* is dark green with tuberculate joints, *O. Davisii*, cylindric, with white sheathed spines, *O. leptocaulis*, a stiff upright bush five feet high and found in western Oklahoma. *O. Davisii* is the most formidable, it grows from one to two feet high, spreading a low tangle of spiny branches, thick set with hooked spines in sheaths.

Of the many species of *Platyopuntia*, there are the Comanche Cactus, *O. comanchica*, the twisted spined *O. tortispina*, the many-spined *O. polyacantha* and the hairy *O. trichophora*; the latter has a heavy covering of long hair-like spines; its lemon-yellow flowers produce parchment-like, vase-shaped seed pods, packed with flat, bony seeds. It is found in north-west Oklahoma. *O. macrorhiza* is particularly susceptible to cultivation and environment. In Oklahoma it grows five feet high; in Mexico, fifteen feet; on its native limestone prairies it grows spines, but under cultivation spines are absent.

All the *Opuntias* are extremely hardy. They will stand 20° of frost and, if planted out in well-drained beds, should grow and flourish in this country if some means were adopted to protect them from incessant rain and keep their roots dry in winter.

Of the sub-genus *Cylindropuntia*, the

following are found in various parts of the State :—

<i>O. alcahes.</i>	<i>O. imbricata.</i>
<i>O. Whippleii.</i>	<i>O. leptocaulis.</i>
<i>O. fragilis.</i>	<i>O. fuscoatra.</i>
<i>O. Davisii.</i>	<i>O. brevispina.</i>

and of the sub-genus *Platyopuntia* :—

<i>O. cymochila.</i>	<i>O. chlorocarpa.</i>
<i>O. humifusa.</i>	<i>O. macrorhiza.</i>
<i>O. Mackensenii.</i>	<i>O. phaeacantha.</i>
<i>O. polyacantha.</i>	<i>O. tortispina.</i>
<i>O. trichophora.</i>	

I have collected Cacti for over thirty years and do not hesitate to say I have never found any that bloom so consistently and magnificently as the Oklahoma Cacti.

Some Notes on Cultivation

By R. S. Farden

I FIND that most succulent plants, other than Cacti, do not respond so well as the Cacti to a resting period during our winter. I find that *Adromischus* prefer to grow in our winter and have their rest in July, August, on to mid-September. And it is the same with *Aloes* and *Gasterias*. *Mesembryanthemums* and *Stapelias* I have now given up to make room for 500 *Haworthias*; these for the last two years I have grown during the winter, giving them a rest in July, August and half September. I get, I think, satisfactory results in this way, though it cannot be perfect, because in their natural growing time it is a good deal warmer than in our winter in the greenhouse, say 50°–65° F. Another reason why it is not perfect is that many species seem to have their own private period of rest and these do not all coincide. They certainly have their own private flowering period. This is most marked and interesting. I set my whole collection of 500 plants out in the order of Dr. von Poellnitz's latest Key and I only grow two or three of each species, to save room.

I have read many times that *Haworthias* flower at any time during the year; that is not entirely true as each species flowers at its own particular period. I notice regularly that my two or three specimens of a species all flower together and show the point of the inflorescence within a day of each other. To-day, three *H. limifolia* plants have flower

stems absolutely the same height, about 1 in. The three plants of *H. confusa* have stems 14 in. long; I thought at first that a fourth plant was another *H. confusa* but it is not in flower and that has caused me to look at it more closely and now I see a slight difference; the fact of it not flowering pointed this out to me. This is not due to the plants receiving the same treatment in soil and watering, because recently I noticed two plants of one species in my collection with inflorescences showing exactly 1 in. high and that same day I saw on Messrs. Neale's stand at the Royal Horticultural Society's Show another specimen of the same species and that plant also had its flower stem of exactly the same length as mine. The treatment had been different, the time of flowering was the same.

For the last two summers I have shaded all my *Haworthias* with beneficial results; some—the soft species—cannot stand the sun, but many of the hard-leaved species are always described as *sun-loving*; in their native habitat they certainly do get the full African sun, but I find that, if we give our full sun in the summer to species like *H. tessellata* and others, the leaves will buckle up or become inflexed and they stop growing, so I prefer to say of them that in our greenhouses under full summer sun they will be *sun-resisting*, which is quite another matter.

Echeverias I water in summer and rest in winter; they come from Mexico. I used to treat *Dudleyas* in the same way, as I wrongly argued that, coming from California, that is in the same latitude as Mexico, they would need the same treatment; but I have recently learnt that, though these two countries are side by side in the same latitude, their climates are reversed and the plant life of California grows in winter. So I now grow the *Dudleyas* in the winter and find *Dudleya farinosa* and other similar species grow much longer leaves if so treated. I have had a plant of *Dudleya nevadensis* for five years; at first it was about 2½ in. across, the next year it dwindled and the following year it was all but gone, being only about ½ in. in diameter, but at that period I changed my treatment of the genus and rested it in summer and grew it in the winter, and now, after two years of the new treatment, it is 5 in. in diameter with three growths standing out on long stems, which may be inflorescences; I do not yet know.

Cotyledons I am also growing in winter, but as yet I have not found much difference between summer and winter growth.

The Cactus Show

THE fifth Cactus Exhibition was held on the 22nd and 23rd June, 1937, in the Royal Horticultural Society's Old Hall. The number of entries in the Competitive Classes was slightly greater than in the previous year, but the increase was in those Classes devoted to Cacti; other succulent

Crassulas. Lawrence surrounded his exhibit with plants of *Echinocactus Ottonis* bearing large golden flowers and had a number of other small Cacti and succulents. W. T. Neale included some large specimens, several in flower, as well as a large number of small plants along the front. Musto's group con-



Fig. 1

One of the Trade groups.

plants were not well represented. The trade exhibits, however, were more numerous.

The West End Flower House arranged a most attractive group of tall *Cerei* and *Opuntias*, with smaller Cacti and other interesting plants in front, whilst large, well-flowered plants of *Crassula coccinea* added colour to the whole. Garways (The London Garden Stores) staged a representative collection of Cacti and other succulents, such as *Euphorbias*, *Mesembryanthemums* and

sisted chiefly of succulent plants, large *Aloes*, *Cotyledons*, *Crassulas* and some good *Mesembryanthemums*.

West, as usual, catered for all requirements for potting and labelling, whilst G. Hayward & Co. were showing frames and a small greenhouse of the Alpine type, the side windows pivoted in the centre instead of hinged at the top, which ensures excellent ventilation. The Electro-Horticultural Equipment Co. demonstrated their strip and panel

heating which greatly simplifies the problem of heating a small house, where the cost of electricity permits. The Royal Copenhagen Porcelain Co. showed pots in various shapes and colours and had a lovely display of glassware engraved with designs of Mesembryanthemums; these designs are very faithful representations of the plants depicted, being either taken from nature or copied from the illustrations in Salm-Dyck's well-known book.

Class 10. One Specimen Cactus. 1st, F. Ducrocq; 2nd, P. V. Collings; 3rd, S. C. Roughton.

Class 11. Mr. Boarder's Seedlings. 1st, A. S. Hibbert; 2nd, Mrs. Vera Higgins; 3rd, K. H. Walden.

Class 12. Cacti from seed sown on or after January 1st, 1935. 1st, A. de Bois; 2nd, J. D. Cuthbertson; 3rd, Mrs. S. J. Cutler.



Fig. 2. *Glassware engraved with designs of Mesembryanthemums.*

The following are the prize-winners in the Competitive Classes:—

Class 1. Twelve Echinocacti. 1st, P. V. Collings; 2nd, Dr. H. T. Marrable; 3rd, S. J. Pullen.

Class 2. Twelve Mammillarias. 1st, P. V. Collings; 2nd, S. J. Pullen; 3rd, J. W. Joyce.

Class 3. Twelve Cerei. 1st, S. J. Pullen.

Class 4. Six Echinocacti. 1st, A. de Bois; 2nd, C. Clarke; 3rd, G. Turner.

Class 5. Six Mammillarias. 1st, S. C. Roughton; 2nd, A. de Bois; 3rd, C. Clarke.

Class 6. Six Cerei. 1st, Dr. H. T. Marrable; 2nd, A. de Bois; 3rd, C. Clarke.

Class 7. Twelve Cacti. 1st, P. V. Collings; 2nd, J. Stephens; 3rd, S. J. Pullen.

Class 8. Six Cacti. 1st, F. Ducrocq; 2nd, A. de Bois; 3rd, S. C. Roughton.

Class 9. Three Cacti. 1st, C. L. Thomas; 2nd, S. C. Roughton; 3rd, Mrs. S. J. Cutler.

Class 13. Cacti from seed, more than two years old. 1st, K. H. Walden.

Class 14. Miniature Garden. 1st, S. C. Roughton; 2nd, H. N. Judd; 3rd, E. C. Edwards.

Class 15. Twelve Succulents. 1st, Mrs. Vera Higgins; 2nd, C. Clarke.

Class 16. Six Succulents. 1st, F. Ducrocq; 2nd, Miss E. M. Chambers; 3rd, R. A. G. Riches.

Class 17. Twelve Euphorbias. 1st, Dr. H. T. Marrable; 2nd, Mrs. Vera Higgins; 3rd, Miss Mackenzie.

Class 18. Six Euphorbias. 1st, A. F. Williams.

Class 19. Twelve Mesembryanthemums. 1st, P. V. Collings; 2nd, Mrs. Vera Higgins.

Class 20. Six Mesembryanthemums. 1st, P. V. Collings; 2nd, B. S. Williams.

Class 21. Twelve Aloes, etc. 1st, Mrs. Vera Higgins.

Class 22. Six Aloes, etc. 1st, P. V. Collings; 2nd, Miss E. M. Chambers.

Class 23. Twelve Haworthias. 1st, Mrs. Vera Higgins; 2nd, Miss Mackenzie; 3rd, S. J. Pullen.

Class 24. Six Haworthias. No entry.

Class 25. Twelve Crassulaceae. 1st, Mrs. Vera Higgins.

Class 26. Six Crassulaceae. 1st, F. Ducrocq.

The Miniature Garden Cup (Class 14) was won by Mr. S. C. Roughton.

An interesting Non-Competitive exhibit was put up by Mr. F. W. Norman, who showed a number of Rhipsalis, the form of the plant varying from a flattened, leaf-like structure to slender, cylindrical, much branched stems.

Amongst the plants shown were a number of interesting specimens; Mr. S. J. Pullen had a large plant of the curious *Opuntia*



Fig. 3. The Specimen Cacti (Class 10).

Class 27. Twelve Stapelias. 1st, Mrs. Vera Higgins.

Class 28. Succulents from seed sown on or before January 1st, 1935. 1st S. C. Roughton.

Class 29. Succulents from seed, more than two years old. 1st, Dr. H. T. Marrable.

The Evelyn Theobald Cup for the greatest number of points in Classes 1, 2, 3, 7 and 10 was won by Mr. P. V. Collings.

The Lawrence Cup for the greatest number of points in Classes 15, 17, 19, 21, 23, 25 and 27 was awarded to Mrs. Vera Higgins.

The King Cup for the greatest number of points in Classes 4, 5, 6, 8, 9, 16, 18, 20, 22, 24 and 26 went to Mr. F. Ducrocq.

clavarioides, the Nigger Hand, shown in the centre of Fig. 3. Mr. G. Turner included interesting Oklahoma Cacti, chiefly *Echinocerei* and *Mammillarias*, the former having some gorgeous blooms.

Correction

IN *Cact. Journ.*, v, 47, I wrote that *Pachyphytum longifolium* Rose is figured in the *Cact. & Succ. Journ.*, iii, 9. Mr. E. Walther, the author of this photograph, writes me now that the plant there figured is not *Pachyphytum longifolium* but a form of *Pachyveria*.—Karl von Poellnitz.

On the Use of a Rich Compost for Cacti

By B. S. Williams

THOSE who have been fortunate enough to be present at the Society's Meetings when Mr. Boarder has either given a talk or joined in the epilogic discussions, cannot fail to have been struck, as I was, by his insistence on the use of a rich compost for the successful cultivation of *Mammilarias*, and all who have had the pleasure of seeing his plants will grant that he is pre-eminent in the growing of this class of Cactus. Various German growers recommend the use of *old* cow manure and *old* rotted leaf mould in the potting medium. The success of the German "cactophiles" in the growing of Cacti is so well known as to need no comment.

With these two authoritative dictions in mind, I began to wonder if the usual "starvation" (please pardon the use of the word) compost with the proportions of burnt clay, broken brick and sand, far exceeding that of the loam, was the best that could be used for Cacti.

The mere mention of the use of manure for Cacti to one or two older and experienced hands called forth emphatic dissension, but from what I could gather, they had never actually given a rich soil a trial but had *read* it should not be used as the plants rotted when the roots came in contact with manure or humus. But do they? My experience is not only that they do not do so, but that the plants thrive much better when it is used. As Cactus lovers, our aim should be to grow them as near perfection as possible, and anything done to attain this end is, I venture to think, a move in the right direction.

Having arrived at the decision to experiment with a rich medium, the question arose as to its composition. Three or four years old cow manure was not available, but I had in the garden an old heap of slaughter-house manure that had been in my possession for two years and was one year old when I bought it. Here was richness indeed! According to my butcher, who supplied it, this manure is composed of pony and hen dung, blood, gut, contents of paunches, pig bristle, etc.—in short, the usual rejectamenta of a slaughter-house with the addition of pony and hen dung. The manure at this stage of decay had reached the texture of black, and when moist, somewhat waxy, earth. The compost eventually used consisted of $\frac{1}{3}$ this manure, dried and pressed through a $\frac{1}{4}$ -in. sieve, $\frac{2}{3}$ of rotted, stacked loam from grassland, with a sprinkling of sand and old mortar rubble.

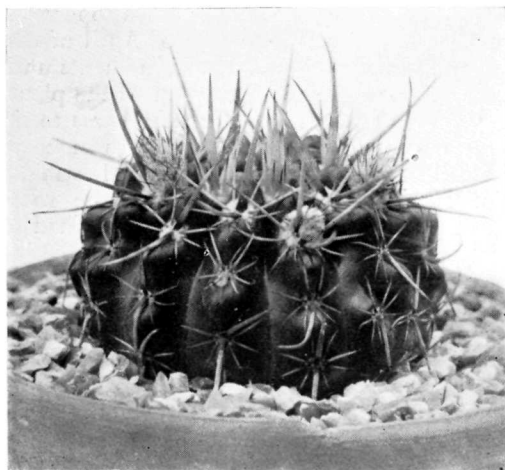
Mr. Boarder, still my mentor, has publicly disparaged the use of the usual $\frac{1}{3}$ drainage of broken crock and brick and, in order to be consistent in my new venture, I substituted one of the well-known, patent, perforated zinc crocks, covered with a single layer of small limestone chippings.

Having in mind that I was on the right track, I risked the whole of my collection by repotting in this medium; this operation was begun about the middle of April of this year and was continued in odd moments until about the middle of May, when all the plants had been dealt with. My method was to tip the plant out of the pot, remove as much as possible of the old soil by shaking and washing, but taking great care to injure the roots as little as possible. Thus the plants had to start life afresh in the new medium. The compost was used quite dry and the repotted plants were stood on wet granite chippings, heavy overhead spraying was given each evening for a fortnight when it was considered that the plants were ready for their first watering.

After establishing themselves, it was not long before evidence of the effect of the new medium became apparent; growth was rapid and robust health was obvious, so much so that the epidermis in a number of species, e.g. the sparsely spined species of *Echinocerei*, took on a brilliant polish, appearing—as one of our members said when he paid me a visit—as if they had been varnished.

It is now three months since the inception of the experiment and the result is very encouraging, as all the plants, with the exception of two "miffers" which for some reason have never grown since I had them, have grown much faster than they had done hitherto in the "starvation" compost, and all look in the finest condition. Flowers have been more numerous, but on this point at least a year's observation is needed, as it is quite possible that, in certain species, the flower bud is formed during the previous season's growth. However, perhaps I may be allowed to cite the instance of a certain *Echinopsis*, name unknown, but in all probability one of the all too numerous hybrids, the existence of which is to be deplored. This plant is about 3 in. in diameter and had never flowered with me before, but during late winter a flower bud was discovered to be forming. Mention is made of this as the incidence of this par-

ticular bud was not due to the rich compost, as it was formed before repotting; but after the effects of the new manure had shown themselves by the rich colour and gloss of the plant, flower buds continued, and are even now continuing, to form. Are these due to the feeding or were they in the process of formation last year? I am inclined to the former view, as otherwise those starting to appear now would have begun to form eight or nine months ago, which I cannot believe.



Malacocarpus submammulosus.

Other Echinopses that have not flowered with me previously are now developing flower buds.

One more instance, a smallish plant of *Notocactus ottonis* had four flowers in June; as I write there is evidence of a second flowering on the way; *N. ottonis* has never flowered more than once in a season with me before.

The effect on spine formation is in many species, but not in all, very marked. In the accompanying photograph of *Malacocarpus submammulosus* the extraordinary difference between the spines of last year and the enormous spines produced on the crown this season is very striking; it will be noticed that a series of flower buds has developed. This particular plant shows the most extreme response to the manure of any plant that I have.

I may say that all my plants have the surface of the soil in the pots covered with small flint chippings (I use the coarse grade, poultry grit). This covering possesses several advantages; it helps to conserve moisture and thus lightens the labour of watering, prevents the splashing of the soil on the plant if watered

from above, prevents the growth of algae and moss, keeps the roots cool by evaporation from the large area of surface offered by the chips and makes an appeal to the aesthetic sense by forming a pleasing background to the plant when viewed from above.

The plants stand in zinc trays, covered with granite chippings which are kept wet. During the growing season the soil in the pots is never allowed to dry out, and each evening a heavy atomised, overhead spray is given by means of a syringe.

Having read the above notes the reader may say, "So far, so good, but what of the winter? Are these plants going to collapse or rot?" Frankly, I do not think so; the plants are unusually strong and healthy and should have the necessary stamina to carry them through the difficult months of the year. Watering will be reduced gradually at the end of August in order that the tissues may ripen, and none given beyond a light spray on suitable days during the winter months. The granite chippings on which the plants stand were kept wet all last winter, and I found that this prevented much of the shrivelling of the plants and there was less tendency for the roots to dry and die off.

Finally, I have to express my thanks to my colleague, Mr. W. F. Buck, for his kindness in taking the photograph that accompanies these notes.

Notices of Meetings

It has been customary to send the notices of the Monthly Meetings to all members of the Society, but as members resident abroad are unlikely to be able to attend, it is now proposed to notify only those members who live in England. If any member living abroad cares to have the post-cards so as to be kept informed of the Society's activities, they will be sent as before, if notification is made to the Meetings Secretary, Miss H. Mackenzie, 24, Buxton Gardens, Acton, W.3.

Sale or Exchange

MR. F. H. HUGHES, Westfield Nurseries, Packhorse Lane, Hollywood, Nr. Birmingham, has several large specimen Cerei, from 5 to 9 ft. high, including *C. Seidelii*, *jamacaru*, *peruvianus*, *macrogonus*, *Jusbertyi*, *Bridgesii*, etc. The plants, most of which flower freely, can be seen at any time.

Descriptions of *Conophytum* Species

By arrangement with Dr. Louisa Bolus, of the Bolus Herbarium, University of Cape Town, we are able to present a series of coloured plates of *Conophytums*; the first Plate is issued with this number of the *Cactus Journal* and the descriptions of the species there illustrated are given below.

PLATE 1.—A. *Conophytum fraternum* N.E.Br., *Gard. Chron.*, vol. 71, p. 261 (1922), var. ***leptanthum*** L.Bol., *Mesemb.* III, p. 23 (1936).—The origin of this plant is doubtful. It was labelled as being from Garcia's Pass, in the Riversdale Division; but probably some accidental transposition of labels has occurred in the course of repotting. For although at first it seemed sufficiently different from the typical form of *C. fraternum* to warrant its being a distinct species, an examination of more wild material of *C. fraternum* goes to prove that decision cannot be upheld, and it must be regarded as a variety with a more slender corolla of *C. fraternum*, a species which is only known from Little Namaqualand. This variety resembles the collection from Ugrabis Mountain, in the Richtersveld, which was published as *C. Marlothii* N.E.Br. (*Gard. Chron.*, vol. 81, p. 52, fig. 30), and afterwards sunk in *C. fraternum*, both in its size and branching and in having the hard parchment-like sheaths on the branchlets below the season's growth.

Fig. 1, a body, side view, nat. size; 2, do., viewed from above, $\times 3$; 3, do., opened, with portion of fl., nat. size; 4, corolla-segments $\times 2$. See also plate 1, A.

B. *Conophytum occultum* L.Bol., *Mesemb.* III, p. 24 (1936).—This is a good example of the many plants found in South Africa which simulate their surroundings in form and colour and are difficult to see, especially as in this instance, when their flowers are closed throughout the day and only open after dark. The drawing represents a portion of the type-plant collected by Mr. V. S. Peers.

Fig. 1, body with persistent sheath and root; 2, body, side view, nat. size; 3, do., seen from above $\times 3$; 4, do., opened, with portion of fl., $\times 2$; 5, calyx $\times 2$; 6, fl. seen from above, enlarged. See also plate 1a, B.

C. *Conophytum Herrei* Schw., *Zeitschr. f. Sukk.* III, p. 179 (1928).—This species was described without flowers, and it was not until March 1933 that the drawings reproduced here were made from flowering-specimens of the type, supplied by the University of Stellenbosch (S.U.G. 8133).

The structure of the flowers shows a close affinity with *C. minusculum* N.E.Br. and *C. Luckhoffii* Lavis, as well as with *C. reticulatum* L.Bol., in that all have bodies among the smallest in the genus, flowers open in the sunlight, a comparatively short calyx, a long-tubed corolla with richly coloured reddish maroon segments, the innermost of which being more or less yellow in the lower part like the tube-interior, very few stamens placed low down in the tube, and a very short style and stigmas, the latter well below the lowest stamens. *C. Herrei* was discovered by the late Dr. H. Brauns (after whom a *Conophytum* had already been named) on the Giftberg in the Van Rhynsdorp Division.

Fig. 1, 2 bodies with persistent sheaths, oblique view, enlarged; 2, body and fl., back view $\times 2$; 3, do., corolla removed, side view $\times 2$; 4, fl., viewed from above, $\times 2$; 5, long section through portion of fl. $\times 5$; 6, calyx $\times 2$.

D. *Conophytum reticulatum* L.Bol., *Mesemb.* III, p. 25 (1936).—Two collections are represented, namely, that of Dr. C. L. Leipoldt (N.B.G. 634/28) and of Dr. Mary A. Pocock, N.B.G. 778/33, both from the Cedarberg in the Clanwilliam Division, growing among moss and lichens in shallow depressions, or clefts, in the rocks. The netted veining or reticulation on the body is scarcely obvious to the naked eye, except perhaps in the resting sheath, but it is clearly seen under a low-power lens. Another distinctive character is a series of protuberances or tubercles round the margin of the upper surface, which are sometimes regularly arranged.

Fig. 1, flowering body, slightly enlarged; 2, body, oblique view $\times 2$; 3, do., resting, enlarged (Leipoldt); 4, body with portion of fl., enlarged; 5, long. section of portion of fl. $\times 2$.

E. *Conophytum polyandrum* Lavis, *Mesemb.* II, p. 441 (1934).—The compressed bodies, notched or belobed at the apex, place this species in the large section *Biloba*, containing more than 50 species and most of them with yellow flowers. The bodies are glabrous and very often 2 are produced from the previous year's growth. The branches may elongate with age (the plant originally described was 8.5 cm. high), but the internodes are short and entirely enclosed in the transversely rugose sheaths for a considerable time, as illustrated here from a portion of the type-material provided by the University of Stellenbosch (S.U.G. 10382) in April 1936.

The only collection known is that of Mr. H. Herre at Kommaggas in Namaqualand.

Fig. 1, body, side view; 2, do., opened with portion of fl.; 3, fl. viewed from above; 4, calyx, nat. size; 5, fruit, side view, $\times 2$. See also plate 1a, E, figs. 1-2.

flowered in the Stellenbosch University Gardens (S.U.G. 10169) in April 1936, when the drawing was made. The origin of the type-material is uncertain, but Miss Phillimore's collection (N.B.G. 2252/17) was from the neighbourhood of O'okiep. More

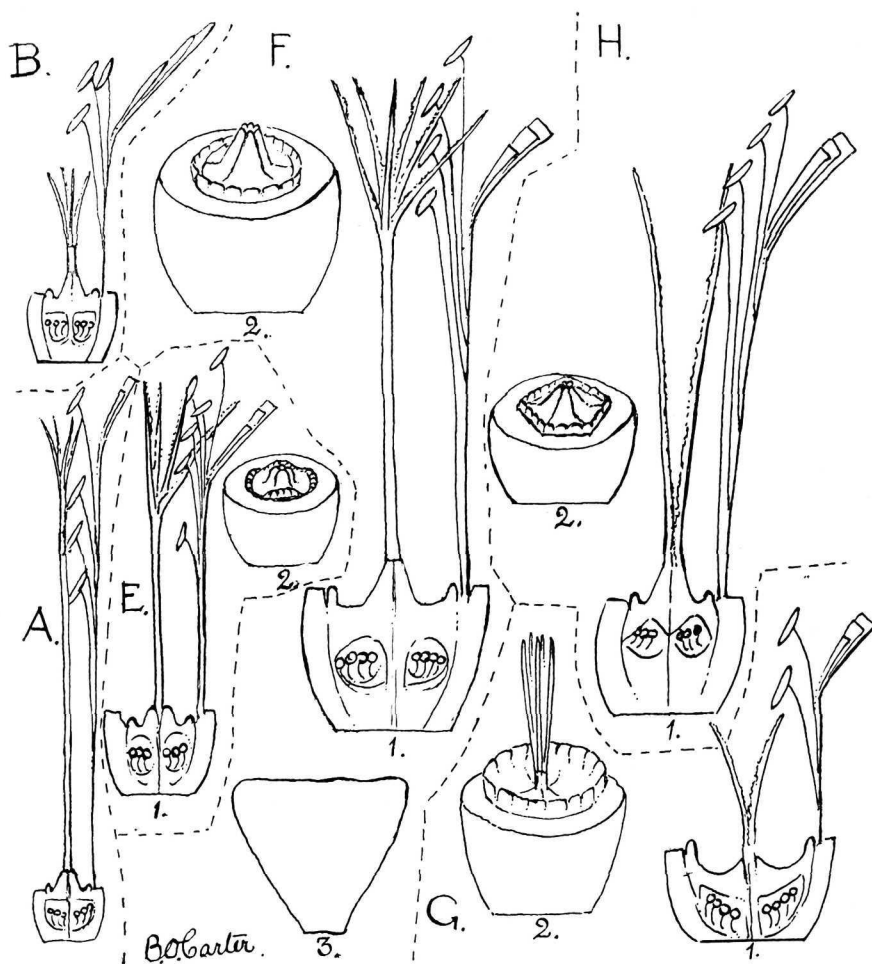


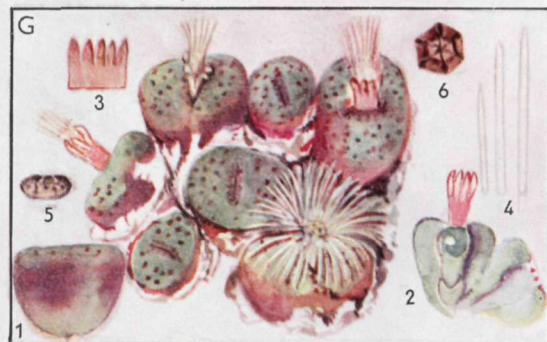
Plate 1a.

F. Conophytum Wettsteinii N.E.Br. *Gard. Chron.*, vol. 71, p. 261 (1922), var. *oculatum* L.Bol.—This variety differs from the typical form (described by A. Berger in 1908 under *Mesembryanthemum*) in having pale rose corolla-segments with white bases which form an "eye" in the centre. The bodies vary in shape as they do in the typical form, and the length of the style ranges from 7 to 9 mm.—in the typical form the length given is 10 to 14 mm. Our variety was collected in September 1933 at Noisabis, in the Richtersveld, Little Namaqualand, by Mr. H. Herre, and

recent collections of the typical form are those of Mr. N. S. Pillans (5763) from the Copperberg and Mr. L. E. L. Taylor (N.B.G. 258/35) from Klipfontein.

Fig. 1, body, cut open, with fl.; 2, calyx; 3, corolla-segments, nat. size. See also plate 1a, F, figs. 1-3.

G. Conophytum Nevillei N.E.Br., *Gard. Chron.*, vol. 71, p. 307 (1922).—The plant represented was found on the Giftberg, near Van Rhynsdorp, by Mr. P. Ross Frames in 1929 and has flowered at Kirstenbosch (N.B.G. 1212/29) for several seasons. The



drawing was made in June 1936, the individual flowers opening each night for about a week and increasing in size during that period. The largest measurements are taken in the drawing. The type was discovered by Mr. Neville S. Pillans, whose name it bears, near Van Rhynsdorp, and the species appears to be widely spread in that area and to be very variable.

Fig. 1, body; 2, do., opened, with portion of fl.; 3, calyx, nat. size; 4, corolla-segments $\times 2$; 5, fruit, side view; 6, do., viewed from above, $\times 1\frac{1}{2}$. See also plate 1a, G., figs. 1-2.

H. *Conophytum velutinum* Schw., Möll. *Deutsche Gärtner-Zeit.*, vol. 42, p. 139 (1927).—This is another example of a species in the section *Biloba* with pink corolla-segments—here, however, a deep purplish rose-pink. The bodies are clothed all over with minute hair-like papillae, invisible to the naked eye, but velvety to the touch, an attribute which has supplied the specific name. The lobes are among the shortest in the section. The type-plant was described without flowers, and was of a more compact growth than the original of this drawing, a specimen cultivated in the Stellenbosch University Gardens (S.U.G. 8845) from a collection made by Mr. H. Herre in September 1929, at Kommaggas in the Richtersveld, Little Namaqualand. The drawing was made in April 1936.

Fig. 1, body, side view; 2, do., opened, with flower; 3, fl., viewed from above; 4, calyx, nat. size; 5, old fruit, viewed from above; 6, do., side view $\times 3$; 7, portion of epidermis, enlarged. See also plate 1a, H, figs. 1-2.

EXPLANATION OF COLOURED PLATE

A. *Conophytum leptanthum* L.Bol.—Fig. 1, body, side view; 2, do., seen from above, $\times 3$; 3, do., with flower (corolla removed), cut down one side; 4, corolla-segments $\times 2$.—Locality uncertain. (National Botanic Gardens 196/31.)

B. *Conophytum occultum* L.Bol.—Fig. 1, body with persistent sheath and root; 2, do., side view; 3, do., seen from above, $\times 3$; 4, do., with flower (corolla removed), cut down one side, $\times 2$; 5, calyx $\times 2$; 6, flower, seen from above, enlarged.—Van Rhynsdorp Division; near Komkans, March 1936, *V. S. Peers* (Bolus Herbarium, No. 21458).

C. *Conophytum Herrei* Schw.—Fig. 1, 2 bodies with persistent sheaths, oblique view, enlarged; 2, body and flower, back view, $\times 2$; 3, do. (corolla removed), side view,

$\times 2$; 4, flower seen from above; 5, do., portion of longitudinal section, $\times 5$; 6, calyx $\times 2$.—Van Rhynsdorp Division; Giftberg, *H. Brauns* (Stellenbosch University Gardens, No. 8133).

D. *Conophytum reticulatum* L.Bol.—Fig. 1, body with flower, slightly enlarged; 2, body, oblique view, $\times 2$; 3, do., dormant, enlarged; 4, body with flower (corolla removed), enlarged; 5, flower, portion of longitudinal section, $\times 2$. — Clanwilliam Division; Pakhuis, *C. L. Leipoldt* (National Botanic Gardens 634/28 — Figs. 1-3), Cedarberg, *M. A. Pocock* (National Botanic Gardens 778/33—Figs. 4-5).

E. *Conophytum polyandrum* Lavis—Fig. 1, body, side view; 2, do., with flower, cut down one side; 3, flower, seen from above; 4, calyx; 5, fruit, side view.—Little Namaqualand; Richtersveld, Kommaggas, *H. Herre* (Stellenbosch University Gardens, No. 10382).

F. *Conophytum Wettsteinii* N.E.Br. var.—Fig. 1, body, with flower, cut down one side; 2, calyx; 3, corolla-segments.—Little Namaqualand; Richtersveld, Noisabis, *H. Herre* (Stellenbosch University Gardens, No. 10169).

G. *Conophytum Nevillei* N.E.Br. var.—Fig. 1, body, side view; 2, do., with flower (corolla removed), cut down one side; 3, calyx; 4, corolla-segments $\times 2$; 5, capsule, side view; 6, do., seen from above slightly enlarged.—Van Rhynsdorp Division; foot of the Giftberg, *P. Ross Frames* (National Botanic Gardens 1212/29)

H. *Conophytum velutinum* Schw.—Fig. 1, body side view; 2, do., with flower, cut down one side; 3, flower seen from above; 4, calyx; 5, fruit, seen from above $\times 3$; 6, do., side view, $\times 3$; 7 portion of epidermis enlarged.—Little Namaqualand; Richtersveld, Kommaggas, *H. Herre* (Stellenbosch University Gardens, No. 8845).

PLATE 1a. **A. *C. fraternum* N.E.Br. var. *leptanthum* L.Bol.**—Long. sect. of fl. $\times 5$. **B. *C. occultum* L.Bol.**—Long. sect. of fl. $\times 5$. **E. *C. polyandrum* Lavis**—1, long. sect. of fl. $\times 5$; 2, receptacle, disk and ovary $\times 5$. **F. *C. Wettsteinii* N.E.Br. var. *oculatum* L.Bol.**—1, long. sect. of fl. $\times 5$; 2, receptacle, disk and ovary $\times 5$; 3, body, side view, nat. size. **G. *C. Nevillei* N.E.Br.**—1, long. sect. of fl. $\times 5$; 2, receptacle, disk and gynaeceum $\times 5$. **H. *C. velutinum* Schw.**—1, long. sect. of fl. $\times 5$; 2, receptacle, disk and gynaeceum $\times 5$.

(NOTE.—In the above all the figures are natural size unless otherwise stated.)

A Rock Garden in Southern Rhodesia



The above photographs show two views in Mr. Basil Christian's garden at Ewanrigg where, in 2½ acres, he grows over five thousand Aloes which include at least 160 species.

Conophytum

By H. Jacobsen, Kiel

THIS genus, one of the richest in species, formerly included in *Mesembryanthemum*, is also one of these genera which is most valued by the lover of succulent plants. This type of plant is so modest in its requirements that it is not difficult even for the beginner in the cultivation of succulents to grow them. One can say truly that the Conophytums are the most unassuming of all the *Mesembryanthemums*. At the same time, they are especially fascinating in their manner of growth, flower very freely, and many are attractively coloured. And they need examination to appreciate rightly all the beautiful details of the plant's structure, the fine markings of the body and the often dainty flowers. During recent years many new species have been discovered in South Africa. Earlier the late Dr. N. E. Brown named many new species, and in various authoritative works attempted a systematic arrangement (see the *Gardener's Chronicle*, lxxi, pp. 198, 214, lxxviii, p. 450; lxxix, p. 134; lxxx, p. 31), whilst later Prof. Schwantes of Kiel worked on this genus systematically and proposed fundamental conceptions, especially of the Sections in *Gartenflora*, vol. 76 (1927), p. 424. Latterly Dr. L. Bolus and Mrs. Lavis in Cape Town have established new species mostly described in *Notes on Mesembryanthemum and some Allied Genera*. Whether ultimately all these many new species will be considered good species must be left to the future to decide. Dr. Tischer, of Cologne, one of those most conversant with the genus, who has also described many species, is at the moment working out a key so that we may hope that it will soon be possible to arrange and sort the many species. I give at the end a list of all the species known at the present time.

The Conophytums may be divided into two large groups, the *Derenbergia* group, the so-called *Biloba* group, i.e. the plants are so formed that the conical body is divided above into two lobes. The other group is the *Eu-Conophyta*, plants which are conical or spherical, rounded above or flattened. There are a number of sections but the division into the two large groups will suffice here. Curiously enough the species of the *Biloba* group start into growth earlier than the other kinds.

The Conophytums are dwarf, perennial, very succulent plants, forming clumps, usually stemless; a few species, especially those

belonging to the *Biloba* group, form stems when old. The roots are 10–15 cm. long, in the stem-forming species sometimes with long main roots. The growth consists of small, fleshy bodies which are conical, spherical, egg-shaped or almost cylindrical. The bodies are convex above, flat, depressed, with a small \pm complete fissure across the upper surface, or indented or even two-lobed, green, grey, often marked with dots or lines or even gaily coloured, sometimes \pm transparent on the upper part like a window. (Previously the transparent *Ophthalmophyllums* were reckoned as Conophytums; some species such as *C. subfenestratum* and *C. pellucidum* may well represent transition stages to the genus *Ophthalmophyllum*.)

Within the older plants of Conophytum the new bodies are formed. These withdraw material from the older ones, till they become stronger and stronger and all that remains of the old body is a dry skin which encloses the young body and protects it in the dry period. when the new growing period begins, the new body swells up and bursts the often very tough wrappings. The growing period begins about the end of July, in some species even later, and in species of the *Biloba* group, such as *C. frutescens*, *cauliferum* and *biloba*, about the middle of June. From this time onwards the plants should be kept gradually moister. Usually the onset of the growing period can be recognised by the flowers pushing through the old skin or by the splitting of the skin. Since the new bodies are already well advanced, they attain their full development in a short time. The actual period of growth also lasts only a few weeks, according to the species and size. After this period watering should be reduced to the least necessary. In my experience watering should be discontinued at latest by the end of October. The plants are a lovely fresh green colour throughout the winter. At the end of winter, the bodies gradually shrink up and from March to June are in a completely dry state. A group of these plants in spring looks as if all life had departed. All the greater then is the pleasure in summer when the species gradually, one after another, awake to new life and flowering. The position for Conophytums should not be too sunny, for in their native home they grow more or less in the shade of rocks. A light limewash on the windows has proved useful in my collection.

In the growing period occasional spraying of the plants is very beneficial, whilst the Lithops are apt to rot if sprayed. In summer, especially during the resting period, the temperature may be raised to 40° C.; in winter however, 12-15° C. is sufficient. The compost should be very sandy, though the addition of good humus such as old soil from a hot bed is useful. Old mellow loam, some lime rubble and fine ash are recommended.

They may be raised from seed. Seedlings often flower in the second year. In the first year the plants should be kept moist the whole time, i.e. growing continuously. Conophytums can also be increased by cuttings and yield characteristic plants which may flower in the first year. When increasing by cuttings, which should be done in June, one should be careful that an entire body is removed with a small part of the stem attached. They root in a few weeks in sandy soil in a hot bed.

THE SPECIES OF THE GENUS CONOPHYTUM N.E.Br.

advenum N.E.Br.
aggregatum (Haw.) N.E.Br.
albertense N.E.Br. = *Con. Purpusii* N.E.Br.
albescens N.E.Br.
albifissum Tisch.
altile N.E.Br.
altum L.Bol.
andausanum N.E.Br.
Angelicae (Dtr. et Schwant.) N.E.Br.
angustum N.E.Br.
angustum L. Bol. = *Con. nutaboiense* Tisch.
apertum Tisch.
apiatum (N.E.Br.) N.E.Br.
apiculatum N.E.Br.
approximatum Lavis
Archeri Lavis
assimile (N.E.Br.) N.E.Br.
auctum N.E.Br.
auriflorum Tisch.
Batesii N.E.Br.
bilobum (Marl.) N.E.Br.
Bolusiae Schwant.
Braunsii Schwant.
breve N.E.Br.
brevipetalum Lavis
brevitubum Lavis
Brownii Tisch.
calculus (Bgr.) N.E.Br.
calitzdorpense L. Bol.
calitzdorpense Tisch. is therefore a misnomer.
Caroli Lavis = *Ophthalmophyllum Caroli* Tisch.

catervum (N.E.Br.) N.E.Br.
cauliferum N.E.Br.
chloratum Tisch.
cibdelum N.E.Br. = *Con. truncatellum* N.E.Br.
circumpunctatum Schick et Tisch.
citrinum L. Bol.
clarum N.E.Br.
compressum N.E.Br.
Comptonii N.E.Br.
concavum L. Bol.
concinnum Schwant.
convexum L.Bol.
corculum Schwant.
cordatum Schick et Tisch.
corniferum Schick et Tisch.
cornutum (Schwant.) Schwant.
cuneatum Tisch.
cupreatum Tisch.
cylindratum Schwant.
Dennisii N.E.Br.
densipunctum (Tisch.) L. Bol.
depressum Lavis.
dispar N.E.Br.
divaricatum N.E.Br.
diversum N.E.Br.
ectypum N.E.Br.
Edithae N.E.Br. = *Ophth. Edithae* Tisch.
Edwardii Schwant.
Edwardisiae Lavis.
elegans N.E.Br. = *Con. pellucidum* Schwant.
Elishae (N.E.Br.) N.E.Br.
elongatum Schick et Tisch. = *Con. hians* N.E.Br.
Ernianum Lösch et Tisch.
Etaylori Schwant. = *Con. piluliforme* N.E.Br.
exiguum N.E.Br.
exsertum N.E.Br.
fenestratum Schwant.
fibuliforme (Haw.) N.E.Br.
ficiforme (Haw.) N.E.Br.
fimbriatum (Sond.) N.E.Br.
flavum N.E.Br.
fossulatum Tisch.
Framesii Lavis
fraternum (N.E.Br.) N.E.Br.
Friedrichiae Schwant. = *Ophth. Friedrichiae* Dtr. et Schwant.
frutescens Schwant.
Fulleri L. Bol.
geometricum Lavis = *Con. violaciflorum* Schick et Tisch.
germanum N.E.Br.
globozum N.E.Br.
globuliforme Schick et Tisch.
gracile N.E.Br.
gracilistylum (L. Bol.) N.E.Br.
Graessneri Tisch.
gratum N.E.Br.
halenbergense (Dtr. et Schwant.) N.E.Br.

Helmutii Lavis = *Con. Stephanii* Schwant.
Herrei Schwant.
hians N.E.Br.
hirtum Schwant.
incurvum N.E.Br.
inoratum N.E.Br.
Johannis-Winkleri (Dtr. et Schwant.) N.E.Br.
Joubertii Lavis
jucundum N.E.Br.
Julii Schwant.
klaverense N.E.Br.
klipbokbergense L.Bol.
kubusanum N.E.Br.
labyrinthum (N.E.Br.) N.E.Br.
Lambertense Schick et Tisch.
latum L.Bol.
laxipetalum N.E.Br.
Leipoldtii N.E.Br.
lekkersingense L.Bol.
leptanthum L.Bol.
leucanthum Lavis.
leucanthum Lavis *var. multipetalum* L.Bol.
leviculum N.E.Br.
limbatum N.E.Br.
literatum N.E.Br.
Loeschianum Tisch.
longifissum Tisch.
longum N.E.Br.
longistylum N.E.Br.
lucipunctatum N.E.Br.
Luckhoffii Lavis
Luisae Schwant.
luteum N.E.Br.
marginatum Lavis
Markoetterae Schwant.
Marlothii N.E.Br.
Maughanii N.E.Br. = *Ophth. Maughanii* Schwant.
Meyerae Schwant.
Meyeri N.E.Br.
minimum (Haw.) N.E.Br.
minusculum (N.E.Br.) N.E.Br.
minutiflorum (Schwant.) N.E.Br.
minutum N.E.Br.
minutum N.E.Br. *var. laxum* L.Bol.
misellum N.E.Br.
miserum N.E.Br.
modestum L.Bol.
Morganii Lavis
Muri N.E.Br.
multicolor Tisch.
mundum N.E.Br.
muscosipapillatum Lavis
nanum Tisch.
Nelianum Schwant.
Nevillei (Sims.) N.E.Br.
noisabisense L. Bol.
notabile N.E.Br.
notatum N.E.Br.

novellum N.E.Br.
novicium N.E.Br.
nuciforme N.E.Br. = *Gibbaeum cryptopodium* L.Bol.
nutaboiese (L.Bol.) Tisch.
obconelleum N.E.Br. = *Con. obcordellum* N.E.Br.
obcordellum (N.E.Br.) N.E.Br.
obmetale N.E.Br.
obovatum Lavis.
obscurum N.E.Br.
obtusum N.E.Br.
occultum L.Bol.
odoratum (N.E.Br.) N.E.Br.
ornatum Lavis = *Con. percrassum* Schick et Tisch.
oviforme N.E.Br. = *Oophytum oviforme* N.E.Br.
ovigerum Schwant—*Con. gobuliforme* Schick. et Tisch.
Pagae N.E.Br.
pallidum N.E.Br.
pardivisum Tisch.
parviflorum N.E.Br.
parvipetalum (N.E.Br.) N.E.Br.
parvulum L.Bol.
pauxillum (N.E.Br.) N.E.Br.
Pearsonii N.E.Br.
Pearsonii N.E.Br. *var. minor* N.E.Br.
Peersii Lavis
pellucidum (N.E.Br.) Schwant.
percrassum Schick et Tisch.
perpusillum (Haw.) N.E.Br.
petraeum N.E.Br.
pictum (N.E.Br.) N.E.Br.
picturatum N.E.Br.
Pillansii Lavis
pilosulum N.E.Br. = *Gibbaeum pilosulum* N.E.Br.
piluliforme (N.E.Br.) N.E.Br.
pisiforme L.Bol.
pisinum N.E.Br.
placitum (N.E.Br.) N.E.Br.
plenum N.E.Br.
Poellnitzianum Schwant.
Pole Evansii N.E.Br.
polulum N.E.Br.
polyandrum Lavis
praecinctum N.E.Br.
praecox N.E.Br.
praeparvum N.E.Br.
praeparvum N.E.Br. *var. roseum* Lavis.
praesectum N.E.Br.
Primosii Lavis.
puberulum Lavis.
pubicalyx Lavis.
pumilum N.E.Br.
Purpusii (Schwant.) N.E.Br.
pusillum (N.E.Br.) N.E.Br.
pygmaeum Schick et Tisch.

quaesitum (N.E.Br.) N.E.Br.
quarziticum Tisch.
radiatum Tisch.
ramosum Lavis.
recisum N.E.Br.
regale Lavis.
Renniei Lavis.
reticulatum L.Bol.
retusum N.E.Br.
Ricardianum Loesch et Tisch.
robustum Tisch.
Roodiae N.E.Br.
rufescens N.E.Br.
saxetanum (N.E.Br.) N.E.Br.
Schickianum (Bgr.) Tisch.
Schlechteri Schwant.
scitulum (N.E.Br.) N.E.Br.
signatum (N.E.Br.) N.E.Br.
simile N.E.Br.
simplum N.E.Br.
Sitzlerianum Schwant.
Smithersii L.Bol.
sororium N.E.Br.
spectabile Lavis.
spirale N.E.Br.
springbokense N.E.Br.
Stephanii Schwant.
strictum L.Bol.
subfenestratum Schwant.
subrisum (N.E.Br.) N.E.Br.
subtilis N.E.Br.
tabulare Loesch et Tisch.
tantillum N.E.Br.
Taylorianum (Dtr. et Schwant.) N.E.Br.
tectum N.E.Br.
teguliflorum Tisch.
terricolor Tisch.
tetracarpum Lavis.
tinctum Lavis.
Tischeri Schick.
Tischleri Schwant.
translucens N.E.Br.
truncatellum N.E.Br.
truncatum (Thunb.) N.E.Br.
tubatum Tisch.
tumilum N.E.Br.
turrigerum (N.E.Br.) N.E.Br.
udabibense Loesch et Tisch.
uvaeforme (Haw.) N.E.Br.
vagum N.E.Br.
Vanrhynsdorpense Schwant. = *Con. uvaeforme*
 (Haw.) N.E.Br.
Vanzijlii Lavis.
velutinum (Schwant.) Schwant.
vescum N.E.Br.
Victoris Lavis.
violaciflorum Schick et Tisch.
viridicatum (N.E.Br.) N.E.Br.

viridicatum (N.E.Br.) N.E.Br. *var punctatum*
 N.E.Br.
Wagneriorum Schwant.
Wettsteinii (Bgr.) N.E.Br.
Wiggettae N.E.Br.

Electric Heating of Greenhouses

ONE of the problems which confront the owner of a small greenhouse is the decision as to the best and most economical method to be employed in heating it. The English climate is notably variable and, during the winter, periods of frost and comparatively mild conditions alternate in a most irregular and unexpected manner. With the usual type of coke-fired boiler generally installed in greenhouses, the maintenance of fairly uniform temperature conditions becomes difficult as, if the heating is kept on continuously, some days the house will get undesirably warm, while if the stove is allowed to go out, a sudden cold spell will catch the owner unprepared and many treasured plants will be lost.

Electric heating, thermostatically controlled, overcomes these difficulties, as the variations of temperature themselves automatically decide whether the heaters shall be on or off. A few years ago, electric heating was expensive to install and, except in a few favoured localities, costly to run. Now, with the introduction of two-part tariffs or low power rates, electric energy is supplied at $\frac{1}{2}$ d. to 1d. per unit and the running cost then becomes comparable with that of coke heating, more especially for very small installations. Again, with the lower charge for electricity, makers of electrical apparatus have given attention to the design of heating equipment and the cost of installation is quite moderate.

The use of electric heating for the greenhouse is particularly convenient in the cultivation of cacti and succulents, for these plants in general do not demand high temperatures in the winter; a minimum of 45° to 50° F. suffices in most cases, and during long spells of frost, even lower temperatures may be tolerated.

The writer has used electric heating in a Cactus house for some seven or eight years with complete success. The house is 15 ft.

long by 9 ft. wide and is equipped with "Unity" tubular heaters, rated in all at 4 kilowatts; there are six tubes each about 12 ft. in length, mounted under the staging, three on each side of the central path. Each bank is controlled by a thermostat, the setting of which can be readily adjusted to any desired temperature between 40° and 70° F. Two thermostats are employed to avoid overloading. The heater tubes were obtainable in two ratings and the lower one was chosen for two reasons. First, a lower surface temperature for the heater tubes is desirable in a plant house and, secondly, the lower temperature of the windings is conducive to longer life of the heater.

This installation has worked ever since it was put in without any attention whatsoever except that the contacts in the thermostats were cleaned once in the period. Current costs ½d. a unit, so that the running cost is 2d. per hour when the heaters are on. It is but very rarely that the heaters come on during the day, while at night they come on and off at intervals when the outside temperature is low. During the winter months, the thermostats are set at 45° F., while in the spring they are set up to about 55° F., when the slightly higher temperature is advantageous as the plants begin to start into growth. Detailed running costs are not available, as a separate meter has not been installed, but the cost is certainly not high, while the additional convenience fully compensates for any slight excess which might be incurred in comparison with a coke boiler.

Another point to which importance is attached is that occasionally frosts occur in the early summer after the coke heating would normally have been dispensed with and the sudden low temperature might give a serious check to the plants which had begun to grow freely. In such cases the electric heating automatically comes into operation without attention being given and all risk of unduly low temperatures is obviated.

In this greenhouse a small propagating frame is installed which is particularly useful for raising seeds and rooting cuttings. This frame is provided with an independent, small heater of about 300 watts rating, controlled by a separate thermostat normally set to operate at 70° F. The atmosphere of this box is kept moist by a tray of water and the resulting conditions are ideal for propagating plants.

The installation above described was, to a certain extent, experimental and was put into

use before the question of electrical greenhouse heating had received general attention. At the present time, however, specially designed apparatus, perhaps more suitable and certainly cheaper, is now on the market. Members who visited the Cactus Exhibition in June will have seen the exhibit arranged by the Electro-Horticultural Equipment Co., Ltd., of Harpenden. This firm provides two forms of heater suitable for small greenhouses. The first is a panel heating equipment which, with thermostat, costs £7 to £8, according to size, while the second is a low voltage strip heating equipment which, with transformer and thermostat, costs between £9 and £10. There is, of course, some additional cost for wiring and fixing, an operation which should be carried out by a competent electrician to the requirements of the supply authorities.

Another method of electric heating which is of special interest to growers of succulent plants is that of soil heating by a buried cable of special type. This cable is of high resistance material, so that when the correct length is connected to the supply, heat is gently generated and communicated to the soil in which the cable is buried. This is particularly useful for the heating of frames, and the writer installed such a cable in a 12-ft. by 4-ft. frame about a year ago. A mixed collection of cacti and succulents was kept in the frame throughout the winter and the results were highly successful. A thermostat was installed which switched off the current when the soil temperature was above 50° F. and in consequence the current consumption was extremely low. Practically all plants survived, except a few of the more warmth-loving *Cerei* which were only tried as extreme examples. The treatment proved particularly successful in the case of the *Mesembryanthema*, as they undoubtedly benefited by the freer ventilation which was possible in the frame, as compared with similar plants in a greenhouse. The lights of the frames were opened by day in all but the severest wet or cold weather, while on cold nights mats thrown over the frame helped to conserve the heat and to reduce the condensation of moisture on the under side of the glass. The special cable required is supplied by several of the leading firms of cable-makers and may be obtained from the Electro-Horticultural Equipment Co., referred to above.

The experiment is being continued and it is hoped to give further details of the results obtained in a subsequent issue of the Journal.

W. F. H.

New Species and Varieties of the Genus *Haworthia* Duval

By Dr. Karl von Poellnitz

(Oberlödla, über Altenburg, Thüringen)

IN this periodical, December, 1936, I published the names of new species and varieties of the genus *Haworthia* Duval; the descriptions appeared in Fedde, Repert. xli (1937). To-day I give short descriptions in English of these species and varieties, and also some new combinations.

1. *H. altilinea* var. *mucronata* (Haw.) v.P. comb. nov. — *H. mucronata* Haw. — *Aloe mucronata* Schult. — *H. altilinea* Berger pro minima parte. *H. altilinea* var. *brevisetata* v.P. — Leaves 3–6 cm. long, 9–18 mm. broad, sometimes recurved towards the tip, face flat or a little or scarcely thickened at the tip, edge with little teeth visible to the naked eye, end-bristle up to 4 mm. long, with a smooth keel, pellucid mostly only at the tip.

2. *H. altilinea* var. *limpida* (Haw.) v.P. comb. nov. — *H. limpida* Haw. — *Aloe limpida* Schult. — *H. inermis* v.P. — *H. altilinea* var. *inermis* v.P. — Leaves 3–4 cm. long, 10–16 mm. broad, somewhat thickened towards the tip, face nearly flat or a little convex, pellucid and with 7–9 longer and shorter longitudinal lines from about the middle or in the upper third, back convex, with 1 or 2 keels, pellucid and with 11–13 longitudinal lines towards the tip, keels smooth, margins smooth and more rarely with minute teeth visible only under a lens, end-bristles 3–8 mm. long, mostly smooth.

3. *H. angustifolia* var. *denticulifera* v.P. — Teeth of leaf-edge about 1 mm. long, much broadened towards their base, leaf-coloured, with a very short white awn; face often with a middle line consisting of little tubercles or minute teeth; minute teeth also often between this line and the leaf-edges; back with 1–3 keels; end-bristle 1–4 mm. long.

4. *H. caespitosa* v.P. — Rosette acaulescent, proliferous, soon caespitose, 3–4 cm. across. Leaves rather pale green, a little shining, about 2½–3 cm. long, 6–8 mm. broad, narrow-oblong, acuminate, very often a little incurved at the tip; face nearly flat towards the base, subturgid and therefore a little recurved and indistinctly lighter towards the tip, with 3(–4) somewhat darker, longitudinal lines, scarcely anastomosing, of which only 1–2 reach the leaf-tip, and often with a few minute tubercles; back very convex, obliquely keeled from the middle, with numerous slightly

anastomosing, longitudinal lines, with or without lighter spots towards the tip; teeth on the leaf-margins light, few, remote, often sub-irregularly arranged, up to about ½ mm. long, but up to nearly 1 mm. long at the keel. The tip of the leaf is recurved at an angle of about 10 degrees. End-bristle 2–4 mm. long.

5. *H. diversifolia* v.P. — Caulescent, up to 10 cm. long. Leaves in 3 straight vertical rows, erect-patent, nearly horizontal at the tip, dark green, with warts on both surfaces, the younger leaves very concave on the face, very convex and keeled nearly to the base on the back, ovate-acuminate or more or less ovate-oblong and shorter acuminate with a short mucro, about 2 cm. long, 12 mm. broad, the older leaves broader, shorter acuminate, broadly ovate, 2 cm. long, 2 cm. broad, less concave on the face towards the tip, keeled only in the upper half or towards the tip on the back. Warts concolor, variously shaped, obtuse, low, shining a little at their tips, only a few to rather numerous, irregularly arranged, irregularly confluent on the upper side, more numerous and irregularly confluent to rather distinct cross-rows or irregular groups on the lower side.

6. *H. ferox* var. *armata* v.P. — Leaves about 8 cm. long, 1½ cm. broad at the base, face with nearly concolor tubercles bearing mostly a whitish, subflexuous bristle 3–4 mm. long, back with obtuse tubercles arranged in about 5 longitudinal lines—though the tubercles standing more or less in the middle of this surface mostly have bristles—edges with whitish, rather stout, subflexuous, subremote bristles up to 5 mm. long, end-bristles minutely toothed, up to 4 mm. long.

7. *H. Haageana* var. *subreticulata* v.P. Darker lines on the tip only anastomosing a little; end-bristle about 2 mm. long. The edges and the keels often with inconspicuous teeth.

8. *H. Helmae* v.P. — Acaulescent, proliferous, 5–7 cm. across. Leaves subglaucous, ovate-oblong or lanceolate, acuminate, scarcely shining, 3–4 cm. long, 6–9 mm. broad, face subconvex, a little turgid, very often recurved, smooth or with a subprominent, sometimes tubercled longitudinal line, back with 1(–2) keels, both surfaces translucent and with green longitudinal stripes towards the tip and

also translucent on the edges from the base or from the middle to the tip, edges and keels with whitish teeth up to $\frac{3}{4}$ mm. long, end-bristle single, soon deciduous, whitish, 1-4 mm. long. The transparent leaf part is not abruptly separated from the green part, it has on the upper side 3-4(-5) indistinctly united longitudinal lines, of which only the middle may more or less reach the tip, it is about 1 cm. long; it is mostly shorter and less distinct and sometimes confined to some lighter spots on the back.

9. *H. Hurlingii* v.P.—Rosette acaulescent, proliferous, subcaespitose later, about 3 cm. across. Leaves very pale green, nearly oblong or a little obovate-oblong, subacuminate, very often with a minute mucro, a little shining, up to about 2 cm. long, about 8 mm. broad, face nearly flat towards the base, a little turgid, recurved towards the tip, not incurved and not more translucent at the tip, with about 5-7 slightly darker, inconspicuous, subanastomosing longitudinal lines, of which only a few reach the tip; back convex, keeled from the middle to the tip, with the same lines; edges and keels smooth or with very minute teeth on the edges towards the base.

10. *H. Kingiana* v.P.—Rosette acaulescent, about 12 cm. across. Leaves ovate-acuminate, the older ones spreading and often a little incurved at the tips, green, shining, a little falcate towards the tips, tubercled on both surfaces, $4\frac{1}{2}$ - $5\frac{1}{2}$ cm. long, 3 cm. broad, face subconvex, with a subprominent longitudinal middle line or with 2 longitudinal lines, back very convex, keeled only at the tip, edges with a whitish green cartilaginous border towards the base, which bears tubercles towards the tip or which is absent there and replaced by solitary tubercles, mucro brownish, about 1-2 mm. long. The upper surface has rather numerous, only slightly lighter, roundish, sometimes scarcely prominent, and spot-like tubercles of about 1 mm. across, the lower surface bears numerous, whitish, more prominent, mostly solitary tubercles of the same size, which are arranged in curved, sometimes scarcely distinct cross-rows or which are—especially towards the tip—irregularly distributed.

11. *H. Longiana* v.P.—Rosette acaulescent, few-leaved. Leaves from the ovate-deltoid base gradually narrowed to the tip, the younger ones erect, the older ones suberect, about 20-25 cm. long, 15 mm. broad low down, not shining, tubercles on both sides, face concave or nearly flat, with an indistinct, subprominent middle line, back convex, tip

of the younger leaves with a brownish mucro. The face with minute, concolor or rather whitish-green, roundish or oblong, solitary or rarely confluent tubercles, which are not arranged in cross lines but sometimes in indistinct longitudinal lines.

12. *H. pallida* var. *Payneii* v.P. comb. nov. —*H. Payneii* v.P.—Face of leaf scarcely or not with lighter spots and very rarely with very minute tubercles, back always with lighter spots and sometimes with 3 keels. Pedicels 4-5 mm. long, their bracts 7 mm. long.

13. *H. Parksiana* v.P.—Rosette acaulescent, proliferous, many-leaved, about 2-2 $\frac{1}{2}$ cm. across. Leaves $1\frac{1}{2}$ -2 cm. long, 6-7 mm. broad low down, oblong-lanceolate, acuminate, acute or acutish, green, not shining, erect and patent—recurved towards the tip, face flat or with a subprominent middle line beginning in the middle, back smooth, convex, keeled, keels smooth and margins smooth low down, margins upwards with minute tubercle-like teeth. End-surface falcate-recurved deltoid, about 6-8 mm. long, about 4-5 mm. broad at the base, slightly darker green than the other parts of the leaf, with very numerous, concolor, obtuse, irregularly distributed, sometimes somewhat shining, little tubercles on the face. In cultivated plants this end-surface becomes somewhat lighter and shows 3-5 inconspicuous, darker longitudinal lines.

14. *H. pseudogranulata* v.P. — Rosette acaulescent, few-leaved. Leaves ovate or ovate-oblong, subacuminate, roundish-obtuse, nearly dark green, not shining except at the base, erect-patent, with a little light mucro, about 2 cm. long, $1\frac{1}{2}$ cm. broad, face smooth and concave from the base towards the middle, nearly flat and a little caniculated towards the tip, subrecurved, subturgid, and also subcaniculate at the tip, back convex, indistinctly obliquely keeled, smooth from the base to the middle; both surfaces from the middle to the tip with very minute, very numerous, concolor, solitary, very rarely subconfluent tubercles, which are not arranged in cross-rows.

(To be continued.)

Book Review

BLUEHENDE KAKTEEN UND ANDERE SUKKULANTE PFLANZEN, by Dr. Erich Werdermann; published by J. Neumann, Neudamm; four parts per annum. Price R.M. 16 per annum.

Part 31 of this beautifully illustrated work contains illustrations and descriptions of three

Cacti and a Hoodia. *Echinocereus pensilis* (K. Brand) J. A. Purp. is a slender type, rare in cultivation; it bears beautiful scarlet flowers, the photograph representing a plant which, after thirty years in Dahlem Botanic Garden, flowered for the first time in 1936. *Borziacactus aurivillus* (K. Sch.) Br. & R. has long, red, tubular flowers which do not open wide, but these are seldom seen in cultivation as most of the plants are not yet of flowering size. *Rebutia Marsoneri* Werd. is closely allied to *R. semilis* and was discovered in 1935; the flowers are pale yellow. *Hoodia Currori* Decaisne has large, brownish flowers and is one of the best of the genus; it was described by De Candolle in 1844 and re-discovered by Prof. Dinter about 1913.

Part 32 includes four Cacti. *Lemaireocereus Beneckii* (Ehrbg.) Br. & R. was first imported by F. A. Haage in 1841 and has been much cultivated since then, but it does not flower freely under glass; the illustration is from a photograph taken in the Huntingdon Botanic Garden by Mr. W. Hertrich. *Cochemia setispina* (Coult.) Walton is a great rarity; first discovered in 1867 and described in 1894; the Botanic Garden at Dahlem received plants about the end of last century which flowered for the first time in 1936. *Parodia aureispina* Backeberg, with bright yellow flowers, was first introduced from South America by Fric or Stümer. *Rebutia pseudodeminuta* Backeberg produces flowers very freely; it is a variable species and easily propagated since it makes many offsets.

Herr Friedrich Fedde in his *Repertorium*, Vol. xci, pp. 113-124, has written a most excellent article on the naming of plants which should be read by everyone, botanist or layman, before undertaking any botanical description. From his long experience of publishing botanical descriptions, Herr Fedde is in an excellent position to realise the chief difficulties, and he emphasises the necessity of giving and quoting all the data very carefully and fully, so that there can be no mistake in the future.

Greenhouse Temperature Control

By B. Webb

There are, no doubt, many Cactus enthusiasts who, like myself, have to be away from home all day and consequently find difficulty in regulating the temperature in

their greenhouses in our fickle summer weather. This difficulty can be overcome by making the door open automatically, if the sun should decide to come out strongly. No costly thermostat is required, just proceed as follows; obtain an ordinary break-back mouse trap and fasten this to one of the shelves near the door. Place a small weight on the bait platform and set the trap, putting a piece of wax candle about half an inch thick below the platform. Now, when the temperature of the house rises to 95° F., the candle grease becomes plastic, the weight squeezes it flat and the trap springs. This can easily be arranged to release or overturn a larger weight which is attached to the door by a string passing over a pulley or through a ring, so that when the weight falls the door opens. If preferred, this arrangement can easily be made to operate a roof ventilator instead.

On returning home in the evening, all that has to be done is to re-shape or renew the pellet of candle grease, set the trap, close the door (without, of course, bolting it) and all is ready for the next day.

Nomenclatural Note

On the Correct Spelling and Gender of the Genus *Menticalyx*

IN the *Gardener's Chronicle*, 81, 251 (1927), the late Dr. N. E. Brown established the genus *Menticalyx*, for which he adopted the spelling *Mentocalyx*. He derived the first part of the name from the Latin *mentum*, a chin, and the connecting vowel should be corrected, therefore, as indicated. He later showed that the single species included in the genus, *M. Muirii* N.E.Br., was conspecific with *Mesembryanthemum velutinum* L.Bol. and he therefore transferred it and made a new combination *Mentocalyx velutina* (L.Bol.) N.E.Br. (see Brown, *Tisch.*, Karst., et Labarre, *Mesembryanthema*, 258, figs. 139, 140 (1931)). He thus gave the generic name the feminine gender. According to the International Rules, Art. 72, all modern compounds take the gender of the last part of the name, which in this case is masculine, so that the name of the plant concerned should be written *Menticalyx velutinus* (L.Bol.) N.E.Br.

The technical characters by means of which *Menticalyx* is separated from *Gibbaeum* N.E.Br. are by no means clear. Although *M. velutinus* is a very distinct species, it is probably not generically distinct from *Gibbaeum*.

A. A. BULLOCK (Kew).



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Fig. 1. *Cochemiea setispina* in flower.

“Rare” Cacti

By G. Turner

HAVING described all the Oklahoma species of Cacti in the last two issues, I was somewhat at a loss to know what to write about when our Editor reminded me of a promise to send a few notes for this number.

We Cactophiles often come across the term “rare” applied to Cacti. Some time ago I visited a Flower Show; there were hundreds of Mums, Roses and the usual collection of plants in season in which I was not too interested. All at once I spotted a huge announcement in the distance “Rare Cacti”; of course, my interest was quickly aroused and I made my way to see the exhibit with all possible speed. Alas, disappointment

awaited me. I really could not understand anyone owning such a collection, let alone exhibiting it. As for “rare” Cacti, there was not a single specimen on view that could not have been bought by the hundred. Many could have been purchased in thousand lots.

On another occasion I came in contact with a colleague and discovered that he was a keen collector. He informed me that he had a very fine collection of “rare” specimens. Time prevented a discussion but an invitation to see them was gladly accepted. We met on a Tuesday; the viewing day was arranged for the following Saturday afternoon. Those four days were the longest in living memory, the suspense

great. At last the day arrived and I presented myself at the home of the rare species, about ten miles away from the City. After the usual preliminaries we went down the garden to a small greenhouse which I was surprised to see almost filled with Begonias; there were about twenty small Cacti in two-inch pots, together with a few succulents which my acquaintance proudly showed me. Politeness prevented an explosion but I soon remembered having a very important appointment in Fleet Street and left with an invitation to bring his wife to tea the following day, Sunday. Revenge is sweet sometimes and I had mine.

Why should we tolerate the gross misuse of the adjective "rare"? What are "rare" Cacti? Rare means uncommon, seldom seen, hard to find or obtain and many more definitions. On the other hand, a very fine specimen of a common species could be termed rare, but it would have to be an exceptionally fine one, the "King Pin" of the genus.

At the present time, the Oklahoma Cacti or, I should say, the species that are indigenous to that State, come into the category "rare." There are no collectors or dealers able to supply commercially.

In a Book Review in the *Cactus Journal* for September, Mrs. Higgins translates from *Bluehende Kakteen* a description of *Cochemiea setispina* (Coul.) Walton: "It is a great rarity, first discovered in 1867 and described in 1894; the Botanic Gardens at Dahlem received a specimen at the end of the last century."

Cochemiea setispina is recognised by Britton and Rose, Vol. 4, p. 22. It was discovered by William Gabb in 1867; T. S. Brandegee collected it in 1889; C. A. Purpus also found it in 1889 and described it in the *Cactus Journal* 2. 54. 1899. Presumably the specimen at Dahlem is one of these. The above collectors only found a few odd plants.

It is probably the rarest plant in the United States to-day, for there are very few specimens. Tiny grafted cuttings may be obtained at half a guinea, but they do not show the character of the plant. A Californian friend had what was considered the finest specimen known, a clump of over twenty heads, some a foot high. Unfortunately an unexpected frost came one night last spring and killed the tender tips, ruining the plant as a specimen.

From the above-quoted dates until about the year 1929, there does not appear to be any record of the plant. My friend came

across some old records of the late botanist and collector, Orcutt, and found notes on *Cochemiea setispina* and its distribution, which so intrigued him that he decided to explore for a specimen. Accompanied by a friend, he fitted out an expedition for a six-weeks journey. It is no wonder that collectors are not keen to find *Cochemiea setispina*, its habitat is described as Hades on Earth.

The Peninsula of Lower California stretches south from California for 900 miles, in places being only 30 to 40 miles wide. It is not a state of Mexico but a Federal State, under military rule. The few inhabitants live in adobe huts, palm-thatched, with earth floors, and all are friendly disposed. The roughest of rough roads is 1,200 miles long. On one occasion my friend was six weeks travelling along this road without meeting another car. The maximum speed obtainable is about ten miles an hour; in places one cannot do one mile in that time.

The first and last town south from California is Essena. Here it is necessary to clear customs, obtain permits and other formalities before proceeding.

For three days the Coast Road is followed; it is all desert, all wild. There are only two streams in the Peninsula; on the main road water wells are sometimes found a hundred miles apart. A wall of granite mountains rises down the centre, sometimes attaining a height of 12,000 ft. In some sections not a single drop of rain has fallen in seven years. The first few hundred miles are the habitat of *Mammillaria dioica*, *Ferocactus viridescens*, some *F. Fordii*, *Myrtillocactus Cochalis*, *Machaerocereus gummosus* and, at 200 miles south, one first finds *Lophocereus Schottii*.

At 100 miles the village of Rosario, built around the ruins of an ancient mission, is reached. From Rosario the road turns inland and the country becomes extremely arid; the road then climbs upwards for 30 miles and crosses the mountains. Here are found *Pachycereus Pringlei*, *Ferocactus gracilis*, *Grusonia rosarica* and the very peculiar *Idria columnaris*. About 50 miles along one reaches the Turquoise Mine of San Juan de Dios—and friends. Their nearest neighbours are 25 miles away by trail or 70 miles by car. The mine is at the base of San Juan de Dios Mountain.

Two more days' journey brings the traveller to El Marmal, a huge onyx deposit, then another day to Catavina and on to Punta Prieta; on the last day's journey one arrives at Los Angeles Bay, the shore of the Gulf of California.

Cochemiea setispina was found on the Island of Angel de la Guardé, and from the following brief description one certainly will agree that a Guardian Angel is not a *sine qua non*.

The Island is in the middle of the Gulf, fifty miles through the Strait of Bullinas. Two days were spent in finding an Indian with a canoe; half a day bargaining for the loan of a dug-out canoe, which was the only means of transport. The journey out and back occupied five days' paddling. Two days more were spent on the Island, which is 40 miles long and about 10 miles wide, absolutely barren, with not a tree on it, not a drop of fresh water, no inhabitants, many rattlesnakes, one type of bat and one mouse. The temperature in the shade averages 120°F.

Two days spent searching revealed three fine clumps which were collected and brought safely back. Thus was *Cochemiea setispina* re-discovered. Early this year a wealthy American collector placed a launch at the disposal of another botanist, and with such modern facilities he was able to explore the Island over a long period, but I am informed his search was fruitless. My share of the spoils (Fig. 1) is a fine big specimen; it now has about twenty-four heads, all on one root system and grows in a sixteen-inch diameter tub. I am told it is the finest known specimen in a private collection in the world.

Angel de la Guardé is also the habitat of another very elusive species, *Ferocactus johnstonianus*; please do not confuse this with the common *Ferocactus johnsonii*. This one is almost as rare as the *Cochemiea*. It was first collected by Ivan M. Johnston in May, 1921, and the second time on this expedition. My specimen is about 12 in. high and 6 in. in diameter, the most beautiful of all the species; the spines are all golden and of equal length; it is recognised by Britton and Rose. As a rare specimen it cannot be surpassed.

Machaerocereus gummosus previously referred to, is common in the Peninsula but *Machaerocereus gummosus cristata* is another great rarity, seldom found. One of the finest specimens was discovered early this year, it was about 24 in. high and 18 in. across.

Of the *Ferocacti*, there are many common but beautiful plants and one or two are rare ones. Probably the rarest and certainly the hardest to get is *Ferocactus coloratus*, a new species described by Gates in the *American Cactus Journal* about three years ago. Its beauty rests in its spines which are about $\frac{1}{2}$ in. wide and 1-1 $\frac{1}{2}$ in. long, hooked at the tip. It is found near Punta Prieta.

A beautiful large specimen was found this year and was intended for my collection. After its long and arduous journey across the desert, it was finally left in the Customs for examination; the inspector discovered a colony of strange bugs in its root system and destroyed the plant. Later another specimen was located and afterwards found to have its roots infested with *Nematodes*. This species can claim to be rare.

The nicest species, in my humble opinion, is *Ferocactus gracilis*; it has bright red spines and red flowers and is found near Rosario. Then there is *Ferocactus tortolispinus*, whose

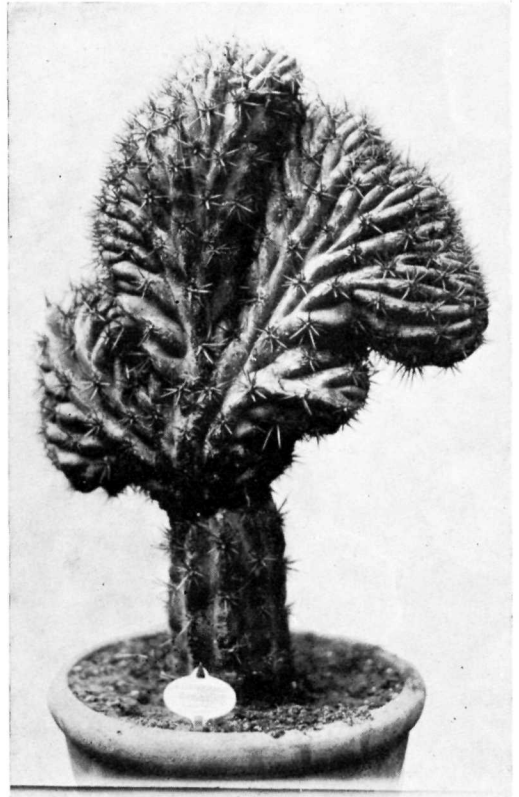


Fig. 2. *Machaerocereus gummosus cristata*.

spines are about 3 in. long, twisted and grey; the flowers are golden yellow; this also is a rarity. Lastly there is *Ferocactus viscaianensis*, found far down in Lower California and also very rare.

Myrtillocactus Cochal is fairly common but the cristate form of the species is a most beautiful specimen and certainly not common. They make beautiful golden plants; the ladies call mine "Bunny" for it almost resembles a rabbit, but its "fur" is not quite so soft. And of the *Cerei*, *Pringlei* is

another rarity, often wrongly described. This only grows to a height of 30 in. or so, and has long silvery-white spines; it is a *Pachycereus*.

For some unaccountable reason, one of the plants most desired by collectors is *Echinocactus Grusonii*. This is certainly not a rarity; recently I saw two small specimens in Woolworths. But the plants I have described are all equally attractive and rare and they do come under the category "rare Cacti." They grow wild, they may be hard to get but patience is a virtue, and it is much easier to hunt them down with a pen than by sweltering in a temperature of over one hundred degrees in the wilds. Once acquired, they are all easy to grow.

On a future occasion I hope to have available a few illustrations of more extreme rarities, together with fuller descriptions. These notes are penned for the benefit of zealots wishing to collect really worth-while species. For their benefit I suggest the compilation of a list of plants that are not catalogued in price lists. There are many almost unexplored territories such as Ecuador, Venezuela, the Guianas where Cactus species exist but are seldom seen; these constitute "Rare Cacti."

Mammillaria Seeds

By A. Boarder

AS it is nearly three years since I sent out the seed to members for trial growing, I think it would now be a good idea if some of the growers forwarded to the Editor a few notes on how their plants have progressed. Some of the plants have been seen at the Shows, but some members who have not been able to show have no doubt something interesting to tell about their endeavours. It would help others if a short account of the size and condition of the plants could be forwarded by members.

My own plant which I raised from the same seed, sown on 1st January, 1935, has been in flower since July last and is still in bloom on 25th October. It has had between thirty and forty flowers. The plant appears very healthy and has some splendid spines. The size, over the spines, is $3\frac{3}{4}$ inches high and $3\frac{1}{2}$ inches across. I have not given this plant very special treatment this year, except to repot it in the spring in a 4-inch pot in a good loam, sand, mortar rubble and granulated charcoal mixture. When first potted

it looked rather lost in the pot but now it could do with another re-pot, but it must wait until the spring for this. It does seem to me that the main point to remember in growing Cacti from seed is to re-pot into larger pots as soon as the plants are root bound. If one had the time to spare, a plant could be re-potted two or three times a year.

My last offer to give seed for a trial did not meet with the success that I had anticipated; only about two dozen members took advantage of it. The classes which have been included for the seedlings at the Shows have not been too well supported, and I feel sure that the experiment could be repeated with better hope of success now that more members have had experience with raising Cacti from seed. In the hope of getting many more members to try their skill at this very fascinating pastime, I am again willing to give a portion of seed to any member who will send me a stamped, addressed envelope. As before, the seed will not be sent out to reach any member before the New Year. I will choose seed from one of my Mammillarias, gathered this autumn. The name will not be given, to obviate the possibility of any other plant being exhibited that was not from my distribution. Each member will receive the same amount of seed from the same plant, so that there will be an equal start for everyone. I hope that as many members as possible will avail themselves of this offer as it can be readily imagined how interesting would be a class of these plants in three or four years' time, consisting of forty or fifty entries. There is no reason why everyone should not enter, as the seed may be sown in a 60 flower pot if desired, taking up very little room in the greenhouse. I do not intend to enter in competition with plants I raise from these seeds as it would not be fair. For this reason, I have not entered in the classes at the Shows that have been held. I have, however, tried to take the plant to most of the meetings which I have attended so that many members have been able to watch progress.

Let us hope that every member will enter into the spirit of this competition and send along to me a stamped addressed envelope, and the seeds will be forwarded very early in January. There is no need to write a letter and it would no doubt be more than I could do to reply to everyone, as the counting out of the seeds and their despatch will be quite a task, I hope.

[Mr. Boarder's address is: Marsworth, Meadway, Ruislip, Mddx.]

Pectinarias

By F. H. Rodier Heath

THIS little group of plants is, in my opinion, one of the most unique and interesting of the Asclepiads, and so far as I am able to ascertain is not well known and but rarely seen in collections of Succulents in this country, nor can I recollect having seen them listed in dealers' catalogues, either in this country or the Continent. It is possible it may be seen in South African price lists, but I have not myself seen it.

The two plants figured in this article I have had in cultivation for many years, and both were imports from South Africa some 25 to 30 years ago.

Pectinaria asperiflora is a dwarf subject, the stems seldom, if ever, exceeding one and a half inches in length, and it closely resembles the growing top of a small *Euphorbia mamillaris* divested of its spines, and they are of a dark green colour with a deep reddish tinge in the new growth, and are invariably composed of six ridges, each of which is broken up into irregular fleshy tubercles terminating in a rather sharp point.

The flowers, which are freely borne, are quite unique and are well seen in the photograph (Fig. 1).

Botanically they are described as pentagonally sub-globose and shortly conical in shape, pointed when in bud, and more obtuse when fully developed, with the margin of the lobes united. The colour outside is a purple brown, and the inside white dotted with purple and covered with large papillae.

Magnified to about six diameters, the appearance of the inside of the flower is most striking and of great beauty, and suggests the crystals hanging from the roof of a cave.

Pectinaria saxatilis is of a different type altogether as far as the stems and also the flowers are concerned, and the former has invariably four almost right-angled ridges on which are borne, at very regular intervals, sharp pointed processes about one third of an inch long, and triangular in shape and very hard and strong.

In colour the plant is a grey green, and the skin tough and hard, unlike that of *P. asperiflora*, which is soft and succulent.

Growth is of the prostrate type, and wherever the stems come in contact with the soil roots are thrown out.

The plant in Fig. 2 is not typical as it is a quite young specimen, but it has now grown to a large size and some of the stems are now

nearly 18 inches long, but the photograph shows the flowers well, and these are deep chocolate in colour, and like the plant first described are ovoid, five-lobed and united at the points, but the appearance under the lens is not nearly so striking as in *P. asperiflora*, which for beauty stands by itself.

The method of growth in this plant is peculiar, as an old stem will sometimes continue to grow in length for several years in the same way as a tall *Cereus*, whilst at other times offsets are given off more or less at right angles to the main stem, and these

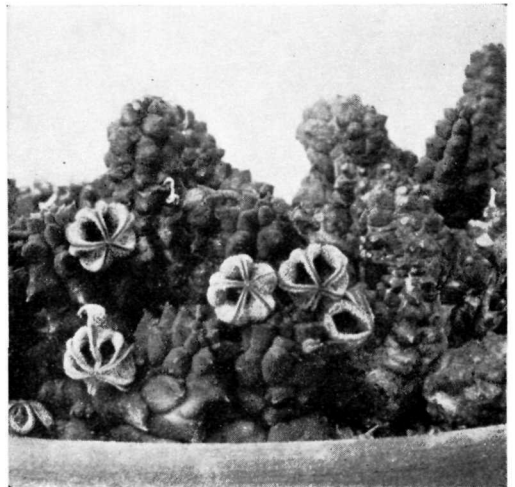


Fig. 1. *Pectinaria asperiflora*. Nat. size.

will root if in contact with the soil, or continue to grow on over the rest of the plant till there is the appearance of the growths crawling over one another, so to speak.

As regards culture, a greenhouse temperature is very suitable and no artificial heat is necessary in summer, but in winter a little more heat than is usual with Mesembs is an advantage, although the conditions must not be close and stuffy, and a buoyant atmosphere is much appreciated.

My plants are grown along with the other South African subjects, but I usually put them in a warm corner near the hot water pipes, and they certainly repay this little consideration.

In the height of summer I think a little partial shade is better than the full glare of the sun, and this can usually be managed by placing a few taller succulents here and there but not too close to the Pectinarias.

In winter, however, they will stand and enjoy all the sun that we get in this country, and are best placed not too far away from the roof glass.

The growing season is much the same as that of the Mesembs, resting in summer—at any rate during the early part—and growing in the later part and the autumn, and it is at this time the flowers appear.

The soil I have found most suitable is a good yellow loam, not too light, with an admixture of brick rubble broken quite small

the pot rings dry, so that in the spring and early summer months, provided there is a certain amount of atmospheric moisture, very little will be needed, and this only if the plant shows signs of shrivelling.

I myself always use shallow pans for potting, my specimen of *P. saxatilis* being in the 10-inch size and about $3\frac{1}{2}$ inches deep; this allows the growths to run at will and at the same time there is no probability of the plant getting waterlogged, as it might do with a larger amount of soil. The grower

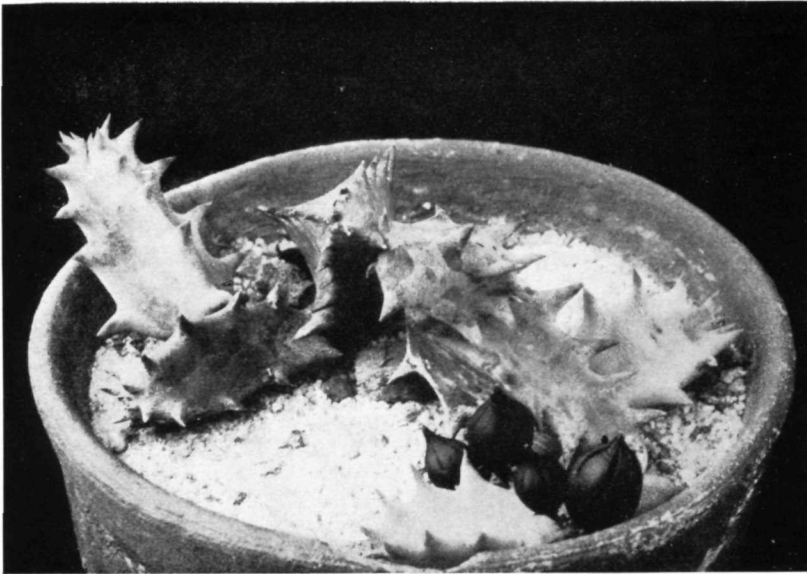


Fig. 2. *Pectinoria saxatilis*. Nat. size.

and the dust sifted out, and adding to this some old mortar crushed up, and also a fair amount of small pieces of charcoal. The addition of charcoal is a matter of opinion, but I find it not only keeps the soil sweet but has the additional advantage of holding a certain quantity of moisture, which can be used by the roots when the soil begins to get dry.

Some people use coarse potting sand, and this is satisfactory if it is really coarse, but I think the brick rubble will suffice. I have sometimes added a little bone meal where the plants are to remain a long time in the same pots, but I do not think this is essential.

Excessive watering must be avoided at all times, a fresh supply being given only when

will, of course, regulate the size of the pan to that of the plant, and it is better to repot as and when required than to have too much root room at first.

I have flowered my plants regularly for many years, but have so far never had any seed pods, probably because mine are from the same plant, which appears to be self sterile.

If at any time a reader of the *Journal* has a piece to spare from some other source, I should be very grateful for it and be pleased to return the compliment.

Some of the stock in cultivation has been derived from my plants, and this is, I think, the case with the specimens at Kew and Manchester.

A Note on the Cultivation of Cacti

By Jason Hill

MR. B. S. WILLIAMS' illuminating article "On the Use of a Rich Compost for Cacti" will prick the conscience of many of us who for years have been starving our protégées for their own good. But it provides food for thought as well as for Cacti, for it shows how much we are at the mercy of logic in horticulture.

It seems quite logical to say, as we usually do, that in order to grow a plant successfully we should reproduce the conditions of its natural environment as closely as possible; but there is a fallacy somewhere, and it lies, I think, in the assumption that plants have a kind of mystic preference for their natural habitat. The truth is that many plants are confined to certain environments in nature because they have been stranded in them by the competition of other plants—they are growing where they are because they have to, and not from preference. Rock plants, for example, are plants which can grow amongst rocks, but they don't grow better there than anywhere else: the sturdy little plants that we buy from the nurseries have never seen a rock, and the high rate of mortality among them when planted out in the rock-garden is depressing for anyone but a nurseryman to contemplate. It may be unseemly for ascetic Cacti to flourish in a mixture of fibrous loam and decayed garbage, but high and difficult alpine plants have been known to grow shockingly well in a mixture of shoddy and cinders.

Mr. Williams' "unnatural" method of growing Cacti opens up, I think, a theoretical possibility of some interest. Cacti, we can safely assume, are descended from some unspecialised leafy ancestor now extinct; but there is a tendency in most living organisms to produce occasionally offspring which revert towards ancestral forms, and, though Cactus seedlings which were less succulent than their parents would perish in the desert, they might survive in artificial surroundings, and hard-raised, rich-fed seedlings might be worth examining for examples of reversion.

There is one quite obvious risk in Mr. Williams' treatment, for the qualities that we admire in Cacti were produced originally by their natural environment and although these qualities are now well fixed and there

is no danger that *Echinocactus myriostigma*, for example, will become actually lush, however well-fed, a plant's organism is slightly labile and its appearance is nearly always affected by the conditions under which it is growing, though the variation may be slight and pass at first unnoticed. But time will show whether Cacti are as conservative as we should like them to be and will retain their fine-drawn, ascetic appearance in the lap of luxury.

There remains the æsthetic factor; for some plants, notably succulents and rock-plants, look best (though I do not know why), in the surroundings by which they have been fashioned; but this, or the illusion of it, can still be preserved, for what lies beneath the rocks and sand need not trouble the eye.

It may be preferable to stick to our preconceived ideas in horticulture—and elsewhere—rather than sacrifice them to facts, but the most successful gardener should be as adaptable as his plants. Most of us have suffered, especially when we were young, from people who knew what was good for us or, even more intolerably, who knew what we wanted, and I sometimes feel that we gardeners are not always as flexibly minded as we might be. We know, for example, that rain-water is better for plants than tap-water. But is it?

It is perhaps fortunate for the human race that no one has ever tried to cultivate it with the ruthless logic of horticulture, for a natural historian from another planet desiring to transplant, let us say, the black-coated species to his own sphere might assume quite naturally that he required six or seven hours a day at a desk with a couple of hours travelling in a crowded vehicle, and he would endeavour ingeniously to reproduce these conditions as closely as possible. But perhaps something like this does occur in the world sometimes without being noticed.

EDITOR: Mrs. Vera Higgins, 28, Northampton Road, Croydon, to whom all communications should be sent. For advertisement rates apply to the publishers.

“La Mortola”

THE Riviera is a strip of Mediterranean coastline stretching from Toulon, in France, to San Remo in Italy. It is so well known as one of the world's finest health and pleasure resorts that a detailed description would be superfluous. Avenues lined with waving palms and orange trees; snow-white villas, red roofed, festooned with the gorgeous blue “Morning Glory” (*Ipomaea*), magenta *Bougainvillea* or yellow *Jasmine*; a sea and sky so blue that the colour must be

It is really a botanical garden, for there is to be found nearly every kind of plant that the climate will allow. Its collection of succulents has brought it into world-wide prominence.

La Mortola is a tiny village huddled on a steep slope; the houses are huddled together as if for protection, and so typical of scores of other places in the district. It overlooks the garden and the sea, 400 feet below. The name is said to be derived from the Myrtle, which is common in the district.

The foundation of the garden as such was in 1867, when the site was purchased by Sir Thomas Hanbury, father of the late Sir Cecil Hanbury, who had always wanted to make a garden in a southern climate and share it with his brother Daniel Hanbury. High up, in a commanding position, stood an old house, then known as the Palazzo Orengo, almost a ruin and reputed to be more than four hundred years old. This was altered considerably, and it is now a very attractive place, fronted with marble pillars. In 1867 the property was sparsely covered with Olive trees and terraces for Vines, with some scattered Aleppo pines. The grounds now cover about 100 acres. Plants were obtained from many parts of the world, and gradually the steep and rocky slope grew into what it is to-day. The planting of succulents must have begun almost immediately, for in 1868 Daniel Hanbury proudly records “forty different species.”

The soil is very poor, shallow and calcareous, consequently it has to be well supplied with organic matter and this soon gets washed out. In winter it becomes extremely “sticky” and difficult to work, while in summer it gets as hard as the underlying rock.

It is more than probable that the tremendous increase in the collection of succulents was due to Alwin Berger, who was the Curator of the garden for many years. He wrote a number of books, including those on *Mesembryanthemums*, *Stapelias* and *Kleinias*, *Euphorbias*, etc., as well as a 500 page catalogue of the plants in cultivation there in 1911. In it, he enumerates about 3,600 different species, and includes some 120 *Agaves*, a similar number of *Aloes*, 150 *Cerei*, 50 *Euphorbias*, 40 *Haworthias*, 90 *Mammillarias*, 120 *Mesemb*s, about 130 *Opuntias*, 30 *Yuccas*, and the representative species of the *Crassulaceae* and other smaller genera.

Annually, about 12,000 packets of seeds are distributed to all the botanical gardens



Villa Hanbury.

seen to be believed. Alluring place-names like St. Raphael, Bandol, Juan-les-Pins, Monte-Carlo, Ospedaletti, Bordighera. Along this coast are to be found some of the loveliest gardens in the world, both municipal and privately owned. There is the renowned “Exotic Garden” in Monte-Carlo, with its giant specimen cacti; every villa is surrounded with lovely flowers.

Probably the most renowned of them all is La Mortola, more correctly termed Villa Hanbury, which is on the Italian Riviera and about three miles from the French frontier.

of the world, in accordance with the wishes of the founders.

The climate is typical of that of the rest of the coast, i.e. hot, dry summers with the rainfall in the autumn and winter months. Most of the rainfall appears in October and November; the winters are usually fairly

outline of Corsica, 120 miles away, with the naked eye. The early mornings are the best times to witness this phenomenon, for the heat haze soon wipes out the vision.

During the spring months the garden looks the most colourful. There are flowers of every hue; Roses of all kinds, Japanese



At "La Mortola."

Above : Flowering Agaves and Jacaranda bush.

Below : *Furcraea Bedinghausii* in centre.

dry and cool and frost is rarely severe, while as much as three months in the summer may pass without a drop of rain. Summer temperatures occasionally reach 90 degrees Fahr. in the shade. The number of cloudless days, often coupled with hot, dry winds, is very noticeable. Another striking feature is the clearness of the atmosphere, instanced by the fact that it is possible to see the rugged

Cherries, Jasmine, Wistaria, blue Plumbago, yellow "Mimosa," and countless others. Later on the Agaves send up their lofty spikes, 30 ft. or more (we used the dead "poles" for rafts when in want of sport!). The Aloes flower mainly in the winter and early spring, and are usually scarlet or yellow. Cold winds spoil them slightly at times. In the summer the huge clumps of *Opuntia* of

many species produce their red or yellow blooms, followed by large, edible fruits. The workers sometimes eat them, but there are always so many other kinds such as Figs, Cherries, "Kakis" (*Diospyros*), Grapes, Peaches and Oranges, which have more appeal.

There are some very fine, mature *Cerei* which flower each year, and ripen their fruits. By way of contrast to these large-flowering species there is a fine specimen of *Cereus* (*Myrtillocactus*) *geometrizans*, about eight feet tall, which bears tiny white flowers in small bunches at the spine-clusters followed by small, purple berries. The latter resemble the fruits of the Myrtle, hence the modern generic name. *Euphorbia canariensis* grows to a great height and flowers freely. There are many others of this genus to be found here and there, but many are not too hardy, and have to be sheltered. This also applies to many of the dwarf cacti from the high mountains of South America. The various kinds of *Echinopsis* grow splendidly and flower profusely.

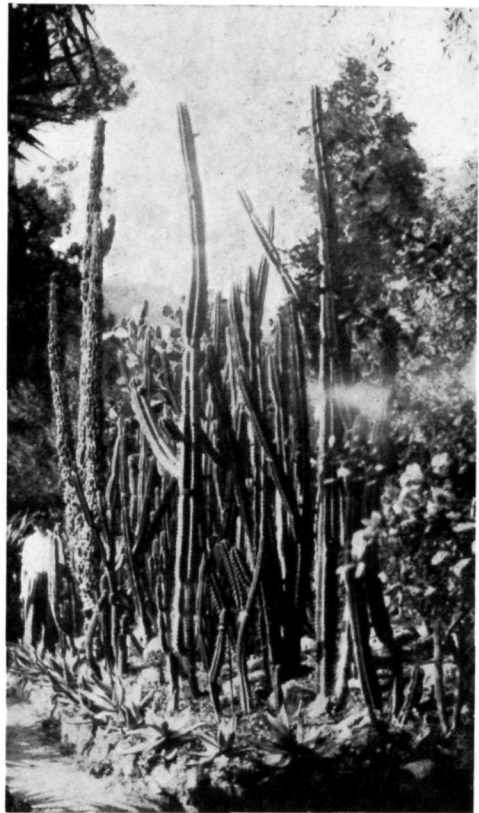
Practically all the Canarian succulents succeed with ease, and the arborescent *Sempervivums* (*Aeoniums*) are found in the dry walls or other places with very little soil or moisture, and they do look lovely when their golden-yellow inflorescences appear. The amount of drought these plants endure is truly remarkable.

Yucca elephantipes is a massive, much branched plant with huge buttresses at the base of the trunk. It produces superb spikes of snow-white flowers each year. The *Dasyliirions* and *Cycads* add much charm, and when in flower are very interesting indeed. *Doryanthes Palmeri* has large, tough leaves and a six-foot spike of scarlet flowers. The *Furcraea* is related to the *Agaves* and, in like manner, dies after flowering. Its inflorescence is much more graceful, the side-shoots are more numerous and pendulous, and the flowers are pale and greenish in colour.

One of the largest, as well as the most beautiful of the *Agaves* is *A. Franzosinii*. Its leaves are silvery-white and are seen at their best in front of a dark background. By way of contrast, *A. Victoriae-Reginae* is barely a foot in diameter, a compact rosette of short, stiff leaves. The latter produces a tall and slender flower spike which is unbranched.

Many of the *Gasterias* are planted on top of the walls in full sun, and yet, in this country we are advised to give them shade. Certain of these walls have been planted with *Echeveria multicaulis*, which branches re-

peatedly, an uncommon occurrence in the genus. The stems and leaves turn a dark red under full sun, so that when it is in flower one is much impressed with these bright patches of colour, which are best seen from a distance. *Bryophyllum tubiflorum* is one of La Mortola's best winter-flowering plants. When not in flower it is still a thing of beauty, what with its symmetry and colouring. The terminal inflorescence contains as many as 250 orange-scarlet bells and it remains attractive from December to May. *B. Daigremontianum* is equally interesting if not so



Cerei at "La Mortola."

popular, owing to its tendency to coarseness unless in very poor soil.

The shrubby *Mesembryanthemums* flourish with ease and flower profusely; in fact, one has difficulty in finding a suitable cutting for propagation purposes. The pendulous *Kleinia radicans* and *Othonna carnosa* are frequently to be seen growing from the forks of Olive and other trees, the seeds having been carried by wind.

A long pergola runs across the garden, ending on an outcrop of rock that looks right across the bay to Ventimiglia. It is covered

with flowering creepers of every kind, too numerous to mention in detail, but it is appropriate to say that the old favourite, *Hoya carnosa*, is included, and a lovely thing it is.

Visitors are often amazed at the number and size of the earthenware jars or vases. Some of them are five feet tall and three in diameter and are said to be of Roman origin. In some of the smaller vessels are to be found *Cotyledon orbiculata* and the less common *C. macrantha* with its huge, red bells. There are stone steps everywhere; about 400 being counted from sea level to the top of the garden on one route alone. Of course there are winding paths for small vehicles and even these are very steep. There are vistas that look down to the sea; vistas direct one's gaze to the mountains; shady corners invite one to rest on one of the many marble seats, perhaps near a fragment of statue, hundreds of years old. There are swaying clumps of Bamboo, avenues of incredibly slender Cypresses, and on the west side of the garden there is a large and well wooded ravine down which a stream trickles in summer and a torrent in winter. In it, almost hidden by creepers, is a very old mill for obtaining Olive oil, driven by the water of the ravine.

An old Roman road, almost obliterated by undergrowth, runs through the lower part of the grounds from east to west. Cut into the stonework are some interesting inscriptions stating who has passed that way. It says that Pope Innocent IV went along it in 1251, and Napoleon in 1796. Traces of this highway have been practically obliterated beyond the confines of the property.

Many distinguished visitors have stayed at Villa Hanbury. On one wall of the "Palazzo" as the villagers still term it, is a marble tablet recording the fact that Queen Victoria sketched the view from her room when she stayed there in 1882. The Duke of Connaught, who had a lovely garden at Cap Ferrat, went to see the flowers each year until very recently. The gardens are also open to the public on special days.

It is really lovely at La Mortola in the summer evenings, to listen to the soft, musical dialect of the village folk trudging down the steep, rocky paths to their nocturnal fishing. They use powerful lights to attract the fish to the surface and then mostly spear them. The "whirr" of the Cicadas, the incessant croaking of small green Frogs, and the exquisite sound of the Nightingale. The latter is commonly heard during the day,

however, and I have watched these little brown birds nest-building and feeding their young, but for all that, they are terribly shy creatures.

To see the full moon rising out of a glassy calm, tideless sea, and shining through the strangely twisted olives is a sight not easily forgotten.

A New Synonym

By A. A. Bullock (Kew) and
H. G. Schweickerdt (Kew)

THE danger of describing new species from sterile specimens, particularly in groups of plants in which great variation occurs in the vegetative organs, or in which "mimicry" forms are abundant, is well illustrated by the recent description of *Cotyledon Bucholziana*, Schuldt et Stephan in *Kakteenkunde*, Heft VII, 111 (1937). The description is illustrated by a photograph, and an endorsement of the validity of the new species by von Poellnitz is also published.

Owing to the resemblance between the new species and herbarium specimens of *Ceraria namaquensis* (Sond.) Pearson et E. L. Stephens (Portulacaceae), which presents a unique appearance, doubt as to its validity at once arose and an enquiry addressed to Herr Jacobsen at Kiel revealed that he was doubtful whether the plant could be referred to the Crassulaceae. He very kindly sent a small plant to Kew.

A very cursory examination of a transverse section of the stem of this plant reveals that it should be referred to the Portulacaceae rather than to the Crassulaceae, and no doubt remains that the plant is actually *Ceraria namaquensis*, reduced in cultivation to a small succulent subshrub, whereas in nature it attains the stature of a shrub or small tree, four to twelve feet in height.

The history of the plant is indicated by the following references to the literature:

CERARIA NAMAQUENSIS (Sond.) Pearson et E. L. Stephens in *Ann. S. Afr. Mus.* ix, 33 (1912); Michell in *Ann. Bot.* xxvi, 1112-3, 1116, 1120, cum fig. (1912).

Portulacaria namaquensis Sond. in *Harv. et Sond. Fl. Cap.* II, 386 (1861-62).

Cotyledon Bucholziana Schuldt et Stephan in *Kakteenkunde*, 1937, Heft vii, 111 (1937), cum fig.

The native habitat is a small area in Little Namaqualand, where it is fairly common, and the adjoining portion of South West Africa.

Pots, Potting and Pottering

By Stuart H. Griffin

(A *Résumé*)

AT a Meeting held on November 9th, 1937, Mr. Griffin again gave one of his delightful talks, which must be heard to be appreciated. It is only possible to give an inadequate presentation of the chief ideas; the wit and humour with which it was enlivened cannot be reproduced in cold print.

In the course of his work, Mr. Griffin gets many enquiries; for instance, what is good for mealy bug? His answer is, *Sempervivums* and *Mesembryanthemums*; but if what is really intended is, what is *bad* for mealy bug, then the answer would be, a judicious mixture of methylated spirit, nicotine and paraffin; if used with great care this will probably kill some of them; if not used with great care, it will probably kill some of the plants.

With regard to pots, being a sceptic by nature, Mr. Griffin feels that small pots, as ordinarily used, are all wrong; he finds that by using big square pans instead of small pots he gets much better results. This year he has tried moving plants (chiefly succulents other than cacti) from 3 inch to 5 or 7 inch pots, giving them at the same time a good rich soil with the addition of bone meal and the resultant growth has been infinitely better; such plants as *Kalanchoe marmorata*, *Aloes* and *Haworthias* have responded very well to this treatment. In the case of *Aloes* that make offsets, if the pot is large enough these will come to the surface, whereas in a small pot the shoot bearing the bud often winds round and round and gets crushed out, without getting a chance of developing properly.

Then again, small pots get very hot and the soil dried out completely; when there are thousands of them, they cannot be plunged individually—the only satisfactory way of getting the whole ball of soil moist again. With large pans this trouble does not occur. If they can be put out of doors during the summer, plunged in ashes, very little more watering is required than the rain will normally provide. For plants which cannot be put out, such as *Lithops* and *Conophytums*, the pots should be sunk in sand, peat, peat moss litter or anything else handy and this plunging material watered, rather than the pots themselves.

Another point of interest is the question of

the best time to sow seeds. With a number of succulent plants, spring sowing results in no germination; on four different occasions Mr. Griffin sowed *Testudinaria elephantipus* in the spring and not a single seed came up, but the fifth batch he sowed in the middle of July and every seed germinated.

The same applies to rare *Crassulas* such as *C. quadrangularis*, *columnaris*, *deceptrix*, etc.; these have previously proved unsatisfactory, but, when shown at the end of June this year, gave 95–100 per cent. germination.

On the other hand, it is not always pleasant to have a lot of young seedlings to deal with during the winter, but it is better to have seedlings than that not to have them at all.

This question of the best time to sow seeds is connected with the wider question of the growing period of the plants. For instance, do plants from South Africa grow in *our* summer or in *theirs*? In South Africa there is no winter season as we know it and a number of plants there do grow in their winter, which is cooler than the S. African summer but not cold. Some, at least, of the *Cotyledons* grow in our winter, so does *Echeveria leucotricha* though *Echeveria pulvinata* is dormant now, while the *Kleinias* (*Senecios*) are not only growing but flowering now.

Then again, many leaf-cuttings are more successful if taken in autumn rather than in spring; leaves of *Crassula (Rochea) falcata* were set to root on October 23rd and by January 12th young flower spikes were showing, though they had been in an open frame heated only by a small lamp in frosty weather. A stump of *Echeveria gibbiflora* var. *carunculata* cut on June 5th had made good buds by August 2nd.

Mr. Griffin strongly advises keeping a diary of operations, though owning that he was somewhat discouraged in his own endeavours on finding that his family had entered their birthdays! Still, it can be extremely useful to look back and find the dates on which certain operations were carried out. Quoting from his diary of this year, Mr. Griffin reported that he had been watering with the hose through January and February, that the propagator was started at a temperature of 80° F. on February 20th, that in June there was a plague of field mice,

and that on August 1st he put his *Haworthias* out under the shade of an apple tree, which seemed to have benefited them enormously. (During the discussion which followed, a member objected that apples would fall and damage the plants and that there were slugs, etc., under apple trees which would also do damage; but in reply the lecturer pointed out that, in a well-conducted garden, apples were picked, not left to fall, and that, also in a well-conducted garden, slugs did not accumulate; his soil is 99 per cent. sand and slugs are infrequent anyway.)

On September 9th the rain was becoming too heavy, so many plants were taken in—and there had been no rain since! On September 19th the fire was started, and there had been no frost so far—but a little firing at this time of year is useful to keep the house dry.

Mr. Griffin said he had always liked the definition of a specialist as a man who knows more and more about less and less; he had now found an even better definition by G. K. Chesterton: a specialist is a man who knows nothing else. This arose in connection with the difficult question of naming plants; in the lecturer's opinion, no one should give a name to a new species until he had grown twelve plants of it and kept them for twelve years under twelve different conditions; plants can vary so much in different environments.

Mr. Griffin then referred to his experiences with various succulents; for instance, he found that *Echeveria lanceolata*, a beautiful plant with a sunset rosette of pink-edged leaves, would not do anything, so he cut off the head which died but the trunk grew an amazingly good new head and ten plantlets appeared round the base. *Aloe Greenii* was repotted and the buds which had been curled round amongst the roots brought to the surface where they could develop; two were cut off and planted separately, but after a year have failed to make progress, though from one of them two new shoots have been sent up further back along the stem. Tillandsias, the so-called Air Plants, will grow if hung up by a string, but they do much better if potted in peat and moss and crocks. A specimen of *Sempervivum tabulaeforme* had produced four heads, which may be what certain catalogues list as a "crested variety"; it is certainly unusual. *Senecio gomphophylla* had been received from South Africa but, after cultivation in this country, appeared to be indistinguishable from *Senecio crassipes*.

Mr. Griffin has made it a habit to use his holidays to look for new plants and to get

new ideas; this year he again visited Amsterdam, which he described as a delightful city with 412 bridges to its many miles of canal. Holland has 6 million people, 7 million cows (mostly wearing overcoats on account of foot and mouth disease) and 60 million bicycles—or so it seemed. Everywhere he found Cacti being grown and *well* grown; this he thinks may be due to the fact that these specimens are isolated from the usual greenhouse pests and so do not suffer from mealy bug, etc., as plants in greenhouses do. At Alsmeer he saw a collection of *Haworthias* (unfortunately few were named) grown in beds in large greenhouses, some of which were 15-16 ft. high; the plants were in excellent condition, though it is generally recommended that plants be kept near the glass.

In conclusion, Mr. Griffin suggested that interests and amusements should have some connection with reality. This Society is affiliated to the Royal Horticultural Society, which may be said to stand for "breeding." It may not be possible, as the poet says, to "Ring out the false, ring in the true," but every plant grower knows that it is possible to *breed* out the old and false and *breed* in the new and disease-resisting. And if this principle could be carried further and applied to the human race, there might be some hope for the world.

Editorial

THE second number of our sixth volume appears when the shortening days mean that most cacti and many succulents are now resting, more or less dormant until spring. Another year is ending and its labours and activities may be reviewed, preparatory to making plans for the next season.

It has been urged from time to time that members should make full use of such opportunities as they can find of exhibiting plants at local Flower Shows and, where it is in their power, to urge the provision of special classes for Cacti at such Shows. Evidently much more is being done in this way, with pleasing results; the exhibitor finds his plants greatly interest many of the visitors and, if he can stay near his group, is assured of a busy time answering the numerous questions that will be put to him. Then again, growers of other types of plants are slowly coming to realise that Cacti are not freaks and that the growing of them gives

just as much real pleasure to the cactophil as the growing of roses does to the rosarian.

One of the points that does interest the outsider and the uninitiated is the very wide variety. It is too often assumed that the Cactus enthusiast grows only round things with spines on ; the most attractive succulents from South Africa, Mesembryanthemums, Haworthias, Euphorbias and others, are not

It is always useful to have a "star turn" ; in this case it was provided by *Cissus Juttae*, a good big plant with a crown of glaucous blue leaves, which spent the afternoon being likened to pickled cabbage. Tell a person that this is a Vine and his interest is aroused at once ; unfortunately the "grapes" which had ripened earlier had fallen, but the very idea that such a plant could be related to the

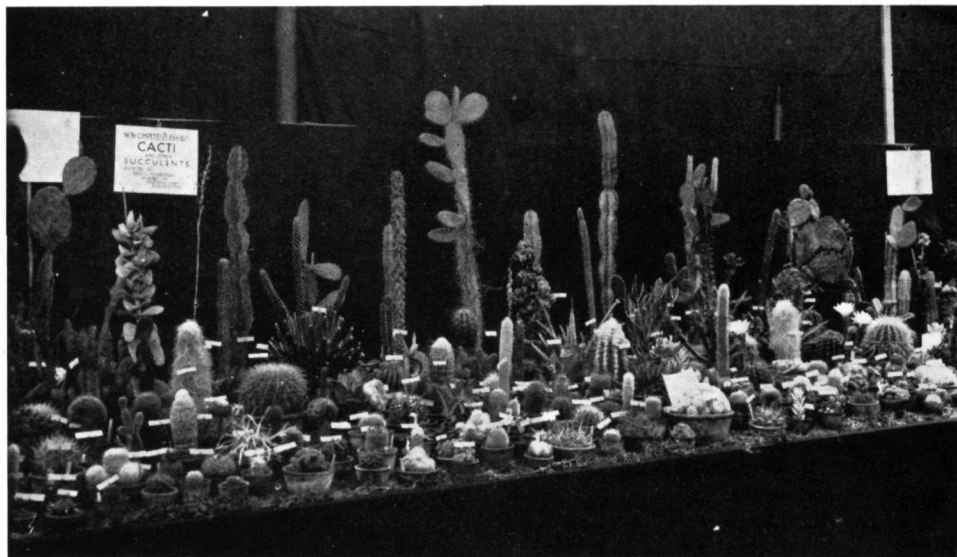


Fig. 1. At Cheltenham Flower Show.

nearly so well known as they should be. So that we should say to anyone proposing to put up an exhibit, make it as varied as you can.

We may perhaps be allowed to refer to an exhibit put up by your Secretary at a Fortnightly Meeting of the Royal Horticultural Society ; its primary purpose was to illustrate some of the plants mentioned in a lecture on "Desert Plants" given on the same afternoon. Our object was to give as many representatives of different families in which succulence occurs as our collection permits. In a space of twenty-five feet we were able to include 325 different species, belonging to 125 genera in 18 families. The sorting and packing of these plants in limited space, their transport to the Hall and back again might well have proved an irksome task, but the real appreciation from the many people who saw the group was ample reward. Some were already growers of succulent plants themselves and such will always find interest in any collection, but many who professed little knowledge of or interest in these desert plants were yet fascinated by them.

ordinary grape vine led to closer examination of the group. Another point that often interests the scientifically-minded is parallel development, by which is meant the production of similar forms under similar conditions of environment in plants which are not closely related botanically. The likeness between the Cacti and certain spiny Euphorbias is well known ; our group was divided into New World and Old World, which made this similarity even more striking as the Cacti are all inhabitants of the New World and the spiny Euphorbias of the Old. Another case is the similarity between such plants as *Senecio stapeliiformis*, *Ceropegia stapeliiformis* and the Stapelias which their stems so much resemble.

So we would suggest that it is a good plan, when putting up an exhibit of succulent plants at a general Flower Show, to put some special plant, if you have one, in a prominent position to attract special attention ; it may prove the downfall of more than one die-hard who hardly considers Cacti should be regarded as plants at all.

Cacti at the Cheltenham Flower Show

NOTEWORTHY exhibits of Cacti and other succulents were staged by two of our members, Mr. A. S. Treasure, Cheltenham, and Mr. G. L. Coventon, Gloucester, at the Cheltenham Floral Fete held on June 22nd and 23rd, 1937. There being no special class for Cacti, the exhibits were entered in an Open Class, which included all types of plants.

Mr. Coventon was awarded a Silver-Gilt

Treasurer's Note

THE subscriptions of many members fall due on 1st January, and it would be a great assistance if these could be sent as soon as possible to the Hon. Treasurer, Mr. J. Haddon, 90, Woodmansterne Road, Streatham Vale, S.W.16. If any member proposes to discontinue his membership (which it is hoped is not the case) notification should be sent; to leave it to be inferred, some months later, that the subscription will not be forthcoming is expensive and unfair to the Society.



Fig. 2. At Cheltenham Flower Show.

Medal and also the *Gardeners' Chronicle* Silver-Gilt Medal for the best Amateur Exhibit in the Show. A photograph of his display is here reproduced (Fig. 1). It occupied a space of 13 ft. by 5 ft. and some 250 plants were staged, including Cacti, Euphorbias, Haworthias and others, many of which were fine specimens. The whole was edged with *Othonna crassifolia*.

Mr. Treasure, whose display is depicted in Fig. 2, was awarded the *Amateur Gardening* Award of Merit; again it consisted of mixed Cacti and other succulents. About 150 plants were shown in a space 7 ft. by 5 ft. This was an excellent example of what can be done with a smaller collection.

[We hope that these examples will encourage other members to exhibit their plants at local Flower Shows, where they always arouse great interest. We are always grateful to members who send us notice of such exhibits and congratulate the two members on their successes reported above.—ED.]

Anacampseros

It is not unusual to find it stated that some species of *Anacampseros* are cleistogamous, that is, they set seed without the flowers opening, being self-pollinated within the closed flower. Certainly many species of this genus produce far more seed capsules than the number of open flowers seen by their grower. On the other hand, the flowers are open for so short a time, sometimes less than an hour, so that they may easily be missed. It was some time before I saw one or two species in flower, because they open between five and six o'clock, a time that I am seldom in the greenhouse. I am also inclined to think that the length of time the flower remains open depends on the time of year. Presumably, when they do open, they will close again as soon as pollination has taken place, and this may be more quickly achieved in full summer with the sun shining than in the duller days of early autumn.—V. H.

New Species and Varieties of the Genus *Haworthia* Duval

By Dr. Karl von Poellnitz

(Continued from page 19)

15. *H. Reinwardtii* var. *Archibaldiae* v.P.—Leaves up to about 4 cm. long, up to 12 mm. broad at the base, face with rather numerous, whitish, rather large tubercles, back with very prominent, white, mostly solitary tubercles of about 1 mm. across, which are arranged in 10–12 longitudinal lines and more or less in cross-rows.

16. *H. Reinwardtii* var. *conspicua* v.P.—Stem more than 20 cm. long, $4\frac{1}{2}$ –5 cm. across. Leaves 5–7 cm. long, 16–18 mm. broad at the base, face smooth only at the base, otherwise with whitish, remote tubercles arranged in 6–8 longitudinal rows and not distinctly in cross-rows, back with small, white tubercles, which are arranged in about 10–12 longitudinal rows and sometimes slightly confluent in cross-rows.

17. *H. Reinwardtii* var. *fallax* v.P.—Face of leaf more or less smooth, back with rather small to rather large tubercles, which are arranged in 5–12 longitudinal lines and which are often confluent in cross-rows.

18. *H. Reinwardtii* var. *major* Bak.—*H. Reinwardtii* var. *pulchra* v.P.—Like the type, but back of leaves with tubercles about 1 mm. across, arranged often in less numerous longitudinal rows.

19. *H. sublimpidula* v.P.—Rosette acaulescent, few-leaved, about $3\frac{1}{2}$ –4 cm. across. Leaves more or less narrowly ovate-lanceolate, up to about $2\frac{1}{2}$ cm. long, 8 mm. broad low down, intensely green, inconspicuously shining, face in the lower half subtergic, flat at the base, sometimes with a subprominent middle line, in the upper half with a deltoid-ovate end-surface recurved at an angle of 10 degrees, back very convex, obliquely keeled or with 2–3 keels, with concolor warts from the middle to the tip, margins with greenish, at the base very dilated teeth up to 1 mm. long. End surface a little lighter, with 2–3, mostly very short green lines, about 11–12 mm. long, 5–7 mm. broad at the base, nearly flat towards its base, a little canaliculate or with elevated margins towards its tip, with very minute, rather lighter warts.

20. *H. Schuldtiana* v.P.—Rosette acaulescent, $3\frac{1}{2}$ –4 cm. across. Leaves oblong-lanceolate, about 3–4 cm. long, about 6–10 mm. broad, rigid, erect, green or reddish-green, face in the

lower part, which is 18–25 mm. long, not pellucid, smooth or mostly with a few, minute, obtuse, somewhat lighter warts, in the upper part recurved-retuse at an angle of about 30 degrees, back convex, keeled, with a few rather darker lines, with minute, obtuse, rather lighter warts towards the tip, edges and keels with whitish teeth up to about $\frac{1}{2}$ mm. long. End-surface about 10–13 mm. long, about 6–9 mm. broad at the base, with minute, obtuse warts and little teeth, nearly flat or subconvex, with 3–5 green longitudinal lines, the middle of which is very long, but scarcely reaches the tip.

21. *H. tessellata* var. *tuberculata* v.P.—Face of leaf flat, with about 4–7 longitudinal lines united into a network, back with rather large tubercles arranged in cross-rows especially towards the tip, edges with rather small, irregularly distributed tubercles.

22. *H. Triebneriana* v.P.—Rosette acaulescent, about 6 cm. across. Leaves thick, erect, nearly lanceolate, $3\frac{1}{3}$ cm. long, about 1 cm. broad low down, face nearly flat, green, not shining from the base to below the middle, retuse-recurved at an angle of about 30 degrees upwards, back very convex, obliquely keeled, with lighter, obtuse, minute tubercles from the middle to the tip, these tubercles rarely with a whitish tooth, end-bristle 3–4 mm. long subdentate, margins with whitish, irregularly, distributed teeth, up to 2 mm. long. End-surface subpellucid, deltoid, a little ovate at the base, 2 cm. long, 6–8 mm. broad, subconvex, but flat or inconspicuously concave at the tip, not at all or scarcely shining, smooth, rarely with 1(–2) minute teeth, with a green middle line reaching nearly to the tip and with 2 shorter green lateral lines.

23. *H. willowmorensis* v.P. — Rosette acaulescent, few-leaved, about $3\frac{1}{2}$ –4 cm. across. Leaves rigid, erect, about 3 cm. long, 10–12 mm. broad, face green and smooth from the base to the middle, subpellucid and recurved-retuse at an angle of about 40 degrees from the middle to the tip, nearly flat towards the base, a little turgid towards the tip, back greenish red, convex, keeled towards the tip, with very low, pale, more or less oblong tubercles arranged in longitudinal rows from the middle to the tip, leaf-edges and keels

with minute teeth, with an end-bristle 1-2 mm. long. End-surface ovate-deltoid, acuminate, about 16 mm. long, about 10 mm. broad at the base, a little unilaterally curved towards the tip, subconvex, with very minute, concolor, very obtuse warts and with several subconvex, with very minute, concolor, very obtuse warts and with several green, sometimes confluent longitudinal lines.

24. *H. Zantneriana* v.P.—Rosette acaulescent, proliferous, caespitose. Leaves not very numerous, gradually narrowed from the base to the tip, lanceolate-subulate, the older ones curved outwards in the upper half or nearly spreading, about 5-7 cm. long, 6-8 mm. broad at the base, acute to subacute, without teeth, face more or less flat, back very convex and keeled, both surfaces rather glaucous green, with very irregular paler spots or longitudinal stripes, margins also often with a paler stripe.

25. *H. Blackbeardiana* var. *major*. v.P.—Leaves 5-7 cm. long, 12-15 mm. broad, with about 3-4 longer and 4-5 shorter green stripes in the upper third of the face, end-bristle 8-12 mm. long, with little setae towards the base, leaf-edge and keel with subflexuous white bristles 2-5 mm. long.

26. *H. Bijliana* var. *Joubertii* v.P.—Face of leaf often with a few bristles towards the tip, back mostly with rather long bristles between the keels and margins, edges towards the tip and keels with bristles 4-5 mm. long, end-bristle 10-15 mm. long, with little setae in the lower part.

27. *H. cuspidata*.—The plant, which I believed to be *H. cuspidata* Haw., which I mentioned in my Key and of which I gave a description in Fedde, Repert, xli, 198, is not the true *H. cuspidata* Haw.; it is probably a new species. Some days ago I received the true *H. cuspidata* Haw. from Mr. Uitewaal, of Amsterdam. *H. cuspidata* is figured by Berger in *Pflanzenreich*, vol. xxxiii (1908), Fig. 33A, see Uitewaal in *Cactussen en Vetplanten*, ii (1936), 153.

Crassula falcata. This plant was, at one time, classed with the Rocheas, as *Rochea falcata*, but is really a true *Crassula*, with large heads of small, scarlet flowers. The Rocheas have longer, tubular flowers; in the best known *Rochea coccinea* these are also scarlet, but the plant is shrubbier and the stems closely covered with leaves in pairs.

Conophytum N.E.Br.

By Dr. A. Tischer

Conophytum subglobosum, Tisch. spec. nov.

(§ *Truncatella*.) Corpuscula obovata vel subglobosa, ad 2 cm. longa, ad 1.3 cm. diam. supra visa fere rotundata vel elliptica, glabra, griseo-viridia, punctis dense notata, ore leviter depresso, 3-4 mm. longo, lobis subglobosis; flores nocturni, albi.

Ceres Karroo.

Plants dividing to form clumps; bodies up to 2 cm. long, circular above to somewhat elliptical, up to 1.3 cm. in diameter, ovate to almost spherical above, fissure somewhat depressed and so almost typically bilobed, lobes much rounded; ground colour grey-green, smooth, glabrous, rather shining, with dark green dots on the upper surface, those round the fissure larger, becoming smaller towards the edge of the upper surface, solitary small dots also beyond and below the edge on the upper part of the sides; fissure 3-4 cm. long, not gaping, not obviously hairy, with extra dots at the edge of the fissure, which do not unite to form a line nor a dark zone at the end of the fissure. Flowers opening at night, white, scented.

Ceres Karroo. Discoverer not known.

I am indebted to Herr H. Herre of Stellenbosch for this new species. It is grown in the Botanic Garden at Stellenbosch under the No. 10527. It is clearly distinguished from other species of the Section *Truncatella* by its considerable curvature above and by the arrangement of the dots; the large dots are distributed over the tops of the lobes, whilst they become gradually smaller lower down.

Conophytum multipunctatum, Tisch. spec. nov.

(§ *Truncatella*.) Planta caespitosa. Corpuscula piriformia, supra truncata, ore depresso ridente ciliato, ad 2 cm. longa, ad 1.5 cm. diam., griseo-viridia, supra et in parte superiore laterum punctis minutis dense notata; flores nocturni, albi.

Uniondale Division.

Plants dividing to form cushions; bodies somewhat pear-shaped, truncated above with depressed fissure; upper side with rather peculiar humps of irregularly circular outline; bodies up to 2 cm. long, up to 1.5 cm. in diameter above; ground colour pale grey-green, the whole upper surface and the upper part of the sides closely patterned with very numerous, fine, dark green dots;

fissure 2-5 mm. long, ends slightly depressed, so that the fissure seems to "smile," like some of the species of the § *Cataphracta*, not gaping, bordered with a number of fine dots; flowers opening at night, white.

South Africa, Uniondale. Discoverer unknown.

I am indebted to Herr H. Herre of Stellenbosch for this species also (No. 10660 of the Bot. Gard. Stellenbosch). It is easily distinguished from all species of § *Truncatella* by its humped upper surface, which gives the outline from above a rather irregular appearance and by the close, fine, numerous dots, so that, even without definite knowledge of the flowers, it can be easily recognised as a new species.

Conophytum calitzdorpense, L. Bol.

The species *Con. calitzdorpense* Tisch. published by me in the CACTUS JOURNAL, Vol. v, No. 1, p. 13, is identical with the species of the same name of L. Bolus, and so must be regarded as a synonym. The publication of the description by Mrs. Bolus was unknown to me at the time that I published it.

Conophytum longifissum, Tisch.

In the original description the flower was not known (see Möller's *Deutsche Gartenzeitung*, 1927, No. 28). The description can now be added:

Ovaries included. Calyx tube 2-3 mm. long, somewhat compressed, up to 3 mm. in diameter, with 5 lobes, 1 mm. long; corolla tube 5 mm. long, whitish; petals 33-35, in 1-2 series, 1 cm. long, narrow, linear, acute, white; stamens somewhat exserted, filament white, anthers yellow, small; stigmas 5, about $\frac{1}{2}$ mm. long like thin threads, on a style 1 cm. long; ovaries flat above.

Bowiea

MANY people are familiar with the great, onion-like bulbs of *Bowiea volubilis*, of which Kew has good specimens, but it is not always realised that the annual stem which yearly climbs along the roof is really the inflorescence with a few small green leaves along it, which soon drop off; the flowers are green and inconspicuous. True leaves are apparently not often produced by adult plants but can be seen in seedlings which have not yet reached flowering stage; these leaves are narrow and strap-shaped, arising from the top of the swollen stem.

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Cereus Macrogonus

The accompanying photograph of *Cereus* (*Trichocereus*) *macrogonus* has been sent by



Cereus macrogonus.

Mr. Thomas Sharp of Westbury, who says: "The flower shown was $6\frac{1}{2}$ inches in diameter. Mr. Cobbold, in his Catalogue of the Darrah Collection, says it is beautiful but rarely seen on cultivated plants. My experience enables me to endorse him; my oldest plant, 24 years old and almost 20 ft. long, has never flowered; another one, 8 ft. tall, has been beheaded several times but has not flowered, but a spindly plant, $4\frac{1}{2}$ ft. tall, bore this flower, the first I have ever seen. The photograph was taken by a member, Mr. A. Bailey of this town."

CACTI from the collection of the late Mr. O. Overbeck are being offered for sale; his house and grounds have been acquired by the National Trust, and the local Secretary of the Trust, Mr. F. S. Matheson, Codner Acre, Salcombe, Devon, would be glad if anyone interested in these plants (chiefly *Mammillarias*, *Echinocacti*, *Cerei* and *Opuntias*) would write to him for particulars.

The Clay-coloured Weevil

GROWERS of succulent plants are familiar with quite a number of pests, mealy bug, root bug, red spider, scale, and most people will think this is enough to contend with. Another plague is being reported and the correspondence relating to it is given below in case other growers may be suffering from the Clay-Coloured Weevil and would like some idea of the best means of combating it.

Mr. L. F. Richardson wrote to ask for help, as follows: "Several of my largest rosette-type *Cotyledons* wilted and nothing I could do was of any avail to save them. On examination, I found inside the thick stem of each at the bottom a large white grub! The villain grubs I have kept in bottles and fed on leaves and now they are metamorphosing. I hope to get them identified later on. I hadn't read about this danger in any of the books and I wonder if it is a frequent cause of misfortune. Is it ever recommended to cover the windows and ventilators with fine netting to keep out flies and moths? Another point: I have apple trees in the garden. Is there any record of apple trees, with consequent codlin moths, etc., being fatal to succulents in the vicinity? Even harder Cacti have suffered. Last year's new "ears" on, say, *Opuntia microdasys*, instead of sprouting afresh this month, curled up and then fell off. If this sort of thing goes on, I shall soon become a 'misocactist' instead of a cactophil!"

Mr. Richardson's letter was passed on to Mr. W. G. Theobald, who has had much experience of growing these plants and later Mr. Richardson also referred the trouble to the Agricultural Pests Department, Cardiff, and having received their report, writes thus:

"I have now had a report from the Agricultural Pests Department of University College, Cardiff, on the 'clay-coloured weevil.'

"The pest in question *was* the clay-coloured weevil, or *Otiorrhynchus*, as Mr. Theobald suggested. The report goes on: *To control Otiorrhynchus larvae in pots several methods are recommended, but I am inclined to think that the best procedure in your case would be to incorporate lead arsenate powder with the compost at the rate of 4-6 ounces per bushel of soil.* This report comes from Dr. E. E. Edwards of the Advisory and Research Department in Agriculture (Cardiff).

"Mr. Theobald's letter was much more interesting! As you may like to have—for

the archives—his words of wisdom and experience, I quote here the relevant part of his letter: *I take it that by 'Cotyledons' your correspondent is really referring to Echeverias, as he talks about the rosette-type. I find the Cotyledons are not attacked, as the stem is too hard. The white grubs of Otiorrhynchus, alias the clay-coloured weevil, feed on the stems of Echeverias and the fully grown beetle on the foliage after dusk, hiding in the soil during the day. This last year we have been freer of it as we have limed the soil and used vaporite where we have bedded plants out. In our case, I think it is generally taken into the greenhouse in the stem of a bedded-out plant, or it is in the potting soil. Burnt clay would, of course, avoid this trouble. Another method is to put down a handful of clover that has been dipped in an arsenical weed-killer or been mixed with Paris green. With the flat rosette-type of Echeveria it is almost impossible to spot the trouble until it is practically too late—the long-stalked ones can generally be saved by cutting them down. The beetle cannot fly so that I don't think it is necessary to net the windows. Practically it is the only pest that has given us any trouble.* Thus Mr. W. G. Theobald.

"I may add that I have reduced the number of the weevils in my garden considerably by going out at night with a torch and picking them off the upper surface of leaves, especially of *Oenothera* and large-leaved *Saxifragas*."

Exhibition in Czechoslovakia

Early this year an Exhibition of Cacti and Succulents was arranged at Prague, under the auspices of the Czechoslovakian Society, the "*Spolek Pestitelu Kaktusu v. C.S.R.*" The exhibition was so successful that it is proposed to hold a World Exhibition next year. The chief countries represented were Germany, where five dealers and a large number of amateurs contributed plants, Austria, Belgium, Holland, South Africa, England and the Principality of Monaco, who were represented by the "*Jardin Exotique.*" The first five countries mentioned sent plants, Monaco sent a fine series of photographs taken in the gardens, and this Society was represented by water-colour drawings. Judging by the photographs received, the exhibits, which were very well set out, must have been of great interest.

Letters to the Editor

"May I congratulate you upon the publication of Dr. L. Bolus' coloured plate and descriptions of the Conophyta and upon Herr Jacobsen's article and list of the genus. One cannot help wishing that some indication of each species could be given and one wonders if 'type' specimens of some of the species of these beautiful little plants exist to-day.

"I have plants of *Conophytum elongatum* and *C. hians* and these certainly are not the same.

"I presume that *inoratum* should read *inornatum*, that *tumilum* should read *tumidum*, and that *Pagae* should be *Pageae*."

H. J. DUNNE COOKE.

"With reference to your nomenclature note by A. A. Bullock in the September issue, it is splendid that someone has raised this point of genders at last, but I believe the genus *Menticalyx* has been discarded for some time, and the many varieties of this interesting plant placed in the genus *Gibbaeum*, as *G. velutinum* L. Bol.

Perhaps also the feminine noun *Lithops* will not be followed by such neuter specific adjectives as *summitatum* and *Ruschiorum*, in future."

H. J. DUNNE COOKE.

"In reply to the above letter, I may remark that I am aware that some authors are not satisfied as to the distinctness of *Menticalyx* from *Gibbaeum*. Personally, I think that it is as distinct as some other genera, and prefer to maintain it for the time being.

"In regard to the gender of *Lithops*. I should like to point out that the late Dr. N. E. Brown was wrong in making this compound feminine, since the second half of the word is masculine. *Lithops*, therefore, should be masculine, and all adjectival specific epithets also masculine. The examples given by Capt. Dunne Cooke as neuter adjectives are, however, irrelevant. *Summitatum* and *Ruschiorum* are genitive plural nouns meaning 'of the summits' and 'of the Ruschiuses' respectively, and consequently are undeclined."

A. A. BULLOCK.

THE List of Members will be reprinted in the New Year, and the Hon. Secretary would be glad to be notified of any corrections or changes of address.

Meetings

In 1938 Meetings will be held at the Royal Horticultural Society's New Hall, Greycoat Street, Westminster, on the following dates:

January 25th.
February 22nd.
March 22nd.
May 10th.
June 8th.
June 21st } EXHIBITION.
June 22nd }
July 19th.
September 13th.
October 11th.
November 29th.

NOTE.—It is proposed to give the subjects of the Meetings in the *Journal* instead of sending post cards, as has been done hitherto. The next Meetings will be as follows:

December 13th, 1937. Dr. Rodier Heath will speak on "Mainly Mesembryanthemums."

January 25th, 1938. ANNUAL MEETING.

February 22nd, 1938. Discussion on How to make Cacti Flower.

No further notification of these Meetings will be sent, please make a note of them.

Bulletin for Cactus Research

In agreement with the German Cactus Society (Deutsche Kakteen-Gesellschaft), the volume of the Bulletin containing the parts issued from 1934-1937, in four languages, containing 400 pages with 231 illustrations and cultural directions, is now offered at RM. 9.50 (postage extra); this makes it possible for more readers to obtain this important work on new Cacti. Good use should be made of this opportunity. The book is not bound but is in a spring-back cover, so that the sheets may be re-arranged.

The new arrangement by which the Bulletin appears as part of the publications of the Deutsche Kakteen-Gesellschaft entails some alterations; the descriptions of the genera will be given in four languages as before, and for the species descriptions will be in German and English only, the French and Dutch text being omitted to save space, which will be used for extra information and illustrations. This work provides very valuable material for those interested in Cacti and should attract a large number of readers. It may be obtained from Curt Backeberg, Im Sorenfelde 15, Volksdorf, Bz. Hamburg, Germany.



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Fig. 1. *Neobesseya rosiflora*.

“Rare” Cacti—II

By G. Turner

SINCE the last notes on this subject, I have compiled a fuller description of *Ferocactus Johnstonianus*, which is unquestionably the rarest of the species and the most beautiful. The plant was first discovered by Evan M. Johnston at Angel de la Guardia on May 2nd, 1921. He was in charge of an expedition into the Gulf of California for the Californian Academy of Science. It was found too late for inclusion

in the *Ferocactus* section of the CACTACEAE by Britton and Rose but was, I believe, included in the Appendix to Vol. 4.

Plant simple, short cylindric, 6 dm. high, or less, up to 3.5 dm. in diameter. Ribs 24-31, margins undulate; areoles elliptic, closely set; spines 20 or more, subulate, much alike, none hooked, slightly spreading and more or less outwardly recurved, 7 cm. long or less, golden to brownish yellow.

Flower, including ovary, 5 cm. long. Perianth segments narrow, golden yellow below, red above; stigma lobes 8-13, flesh-coloured. Scales on ovary orbicular. Fruit small, 2.5 cm. in diameter.

Another rarity not found in dealers' lists is *Lemaireocereus Beneckei*, Berger (Fig. 2), a most beautiful *Cereus* entirely covered with a white powdery bloom over a layer of thick, brownish yellow wax. It is columnar and attains a height of 2½ metres, with stems from 6 cm. to 10 cm. thick, unbranched. Ribs 5-9, deeply notched, areoles 3.5 cm. apart, first white, passing to yellow brown; with

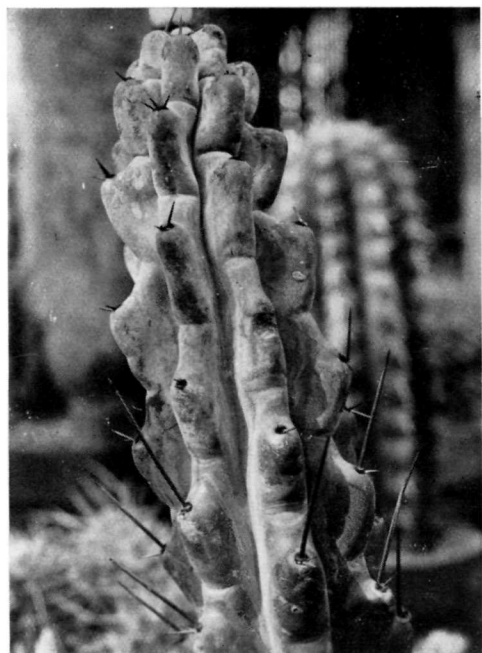


Fig. 2. *Lemaireocereus Beneckei*.

6 straight radials up to 5 cm. long, at first deep red passing to grey; one central spine curved downwards. Once established, it grows freely but is very hard to grow on its own roots. It requires a sandy, porous soil, rich in leaf mould. A native of Central Mexico, it requires sunshine and warmth.

According to Britton and Rose, the distribution of *Melocactis* is from Mexico to Brazil. Three years ago, three entirely new species were discovered by the botanist Hermano Leon, a great authority on Palms and Grasses.

The first to be authenticated was *Melocactus matanzanus* Leon, named after the Province of Matanzan, where the first half dozen plants were found. Their native habitat covers a very small area, almost inaccessible,

and so torrid that no one cares to go there—a five-days' journey from Havana across a desert, all stones and arid desolation. One is accustomed to hearing Cuba spoken of as a land comparable with the Garden of Eden, so that it seems almost impossible for such a desolate region to exist there.

During the last two years Professor Leon has tried to find someone willing to accompany him on a second collecting trip but unsuccessfully. It is necessary to have a companion, to take horses and a pack-horse for each man, water and provisions for man and beast, and that is the sole reason why this new species was not found prior to 1934.

Of the plants themselves, only three are known to be alive to-day—the type plant established in the Botanical Gardens, Havana, a second type plant which was sent, with a botanical description that was published by the New York Botanical Herbarium, and the plant established there, and I received one specimen in July, 1936; owing to its arrival in midsummer, I succeeded in rooting it. The remaining plants were planted in Prof. Leon's garden near Havana and all died.

The description of this new species is as follows:—globular, light green, slightly depressed, 7-9 cm. high, 8-9 cm. wide. Spines 1-2 cm. long, appressed; radials 7-8; centrals 1. Ribs 8-9, vertical, 0.5 cm. high, with several incomplete ribs at the apex. Areoles 7-8 mm. apart. Young plants have white and pink wool at the apex before the cephalium is formed. Of the radial spines, 2 or 3 upper ones are slightly smaller, the rest 1½ cm. long, curved and widely separated; central spine less curved but double the size. The cephalium appears when the plants reach maturity, estimated to be at about 12 years of age; it is 4-5 cm. high and 5-6 cm. in diameter at the base, a brilliant orange-red in colour. The pink flowers are embedded in the wool and open, several at a time, during the afternoon in full sunshine.

I have just received a photograph of the latest discovery in Oklahoma, a new and very interesting *Neobesseyia* with rose-coloured flowers. The botanical description of this new species will shortly be published, and it will be known as *Neobesseyia rosiflora* Lahman (Fig. 1).

A very beautifully illustrated Guide to the Desert Plant Collection of the Hunting Botanic Gardens, San Marino, California, by the Curator, William Hertrich, has been published, giving a description of the range of plants grown there.

Mainly Mesembryanthemums

By Dr. F. Rodier Heath

(Given at the Meeting on December 14th, 1937)

Years ago, as some of you may remember, a Cactus Journal was published, and I am under the impression there was also a Society, but I was never a member and am a little hazy about it, but it did not exist for very long and was largely a one-man affair, and it does not appear to have served any useful purpose.

The present Society and its official organ has already done a great deal to bring together collectors and succulent enthusiasts, not only in England but on the Continent and in South Africa, and I can say without fear of contradiction that it has fully justified its existence and it is a fact that cultivators are far more numerous than they were ever before.

These meetings, where we are able to get into touch with one another, are most instructive and there is a personal and social side besides the knowledge one is able to acquire, which will further foster our endeavours to make the culture of this most fascinating branch of Horticulture still more popular, and it is therefore a great pleasure to me to speak to you for the first time on Mesembryanthemums, a subject which has always appealed to me in a high degree.

I speak, however, with some diffidence because I know full well that there must be some amongst you with quite as extensive knowledge as I possess myself, although my experience is a very long and varied one, and I therefore hope that even the experts amongst you will not be bored and may be interested in some of the matters I shall talk about, whilst the later recruits may learn something which may prove useful.

When I was no more than a lad I began to have a fancy for Cacti, and collected such small things as chanced to come my way, and at that time very few of the so-called stemless Mesembryanthemums were in cultivation—although many had been discovered generations before and lost sight of.

One by one these were re-discovered and sent to this country and also re-named, causing the utmost confusion as you all know; and it was not till the late Dr. N. E. Brown put his whole energies and knowledge into the matter that some sort of order emerged from the chaos, but even now there are some vexing problems in the way of synonyms and nomenclature in general.

The remarks which follow are simply based

on my own personal experiences, and I do not for one moment suggest that my methods are the ideal ones, but at the same time I have been fairly successful as a grower and one goes on results.

The natural home of most of these plants is, as you know, South and South-West Africa, and the seasons there being to a large extent the reverse of our own, the growth in this country must be made chiefly in the late summer and autumn; since all these plants are sun-lovers we cannot grow them in altogether ideal conditions, which brings me to my first point, viz., Climate.

In some parts of this country we are not blessed with ideal conditions in this respect and fogs and dirt are very prevalent during the growing season or part of it, but fortunately for us many of the Mesembryanthemums change their whole bodies in the course of a season's growth and the manner in which this is brought about is familiar to all of you; therefore unlike Cacti and other Succulents the plant does not get choked with dirt and fog, but takes on each season a new lease of life, so to speak.

A high temperature, even in the growing season, is not at all necessary, and in the summer the unheated greenhouse is all that is needed, but there must at all times be abundant fresh air and sunshine together with the very necessary ultra-violet rays which are sadly lacking in foggy and sunless localities.

In the winter, however, there must be some means of keeping out frost and for preference a little more than this, although there are plants which will even stand a few degrees provided more or less dry conditions obtain.

Captain Dunne Cooks informs me that certain species of Conophytum are quite hardy and grow to a considerable clump, but this is in Torquay where conditions are very mild.

In my own district I have no Mesembryanthemums out of doors although I daresay they would thrive, but I have some giant Agaves which have been out of doors for 25 years with no shelter whatever and these are not hardy everywhere; but here the conditions from the point of view of sunshine, ultra-violet rays and a mild winter with usually a sunny autumn, are ideal for growing Mesembryanthemum, and in consequence of this I

have been able to grow and flower plants which have failed elsewhere, such as in London and the suburbs, Manchester and other places where fogs abound and there is a lot of soot and dirt in the atmosphere.

As I have said before an airy greenhouse is very suitable, and many of my plants are grown thus, but I also have a number in cold frames, which are kept open all day in the summer and not completely closed at night; and by open I mean with the lids right off so that none of the very essential light rays are cut off by the glass.

There are no hot water pipes in these frames, but they are open at the back where they are built against the greenhouse, and I find I get sufficient heat from the pipes there to keep out frost except on very cold nights when mats are put on as an extra precaution; and some of the pots have been here for years. The plants in the frames do not make quite such luxuriant growth as those in the warmer greenhouse nor do they, in my experience, come into flower so early, but the growth is harder and more substantial and less inclined to damp off; some, of course, do not seem to thrive quite so well as, for instance, the Lithops, which seem to be happier in an atmosphere a little warmer.

As regards soil there is no doubt a good deal of latitude and opinions of experienced cultivators differ as to this, but I think the mechanical condition is all important, that is to say, it must be sufficiently porous to allow surplus moisture to pass away so that there is never at any time a waterlogged and sour medium about the roots.

I have varied my compost from time to time but, taken on general lines, the all-round mixture consists of a good loam—not too light—3 parts with one part of rubble made up of brick broken up small—with a small quantity of old mortar crushed small into a powder.

A fair sprinkling of coarse sand may be an advantage and many people use this and I do myself very often.

I think leaf mould is also quite useful and I use it for Conophytums and Lithops in the proportion of about one tenth of the whole. Possibly some of you use larger proportions than this and I shall be glad to hear what is the custom of others. Small pieces of charcoal are, I am quite sure, an advantage as this not only helps to keep the soil sweet and porous, but it holds some little moisture which is a point when the pots get on the dry side.

Some advocate old hot-bed manure but I

have never tried it; it may be an advantage or otherwise; I cannot say.

In short, everyone has his own pet compost and no doubt sound arguments in favour of it, but I am of the opinion that a rich compost is much better tolerated where the atmospheric conditions are favourable and there is plenty of air and sunshine.

Good drainage in the pots or pans, whichever are used, is most essential; everyone is of course well aware of this as a necessity for all succulents.

I myself prefer to plant quite firmly, pressing down the soil when not too wet with a blunt stick or label, although it has been advocated by certain growers that one should be content with just a sharp tap on the potting bench and little more, but I have found the former method results in firmer and better growth well adapted to stand the damp of our winters.

Some subjects having long tap roots do better in ordinary pots whilst others thrive in pans, and as regards large clumps of Conophytums, Lithops, Gibbaeums and other dwarf kinds, the appearance in pans is to my way of thinking more attractive. What is known as a "market pot" with its greater depth is suitable for some such as *Phyllobolus resurgens* as it has a long tapering root like a parsnip.

I will not go into the question of growth and rest as you are all well acquainted with this and the periods vary with different species, but most of these plants make their growth in the early summer and autumn and start to go to rest from March on, others on the other hand do not seem to start till September and grow all the winter, for example, the *Phyllobolus* mentioned and the *Monillarias*.

I keep most of my plants growing until November is over and in some cases later, water being used in a moderate degree so that the plants in their green state are not allowed to shrivel.

As regards the size of pots I read with much interest the remarks of Mr. Stuart Griffin in his talk last month, and he advocates the use of pots which give plenty of room, and I think I agree with this in many ways for the reasons he gives, but it is quite possible to be over generous in this respect; on the other hand I rather like the look of a specimen plant with many heads which well fills the pot.

I have some large pans with several plants in each giving plenty of root run such as a specimen of *Rimaria Heathii*, grown in a pan, and another in a small pot, both of which

started under the same conditions, and the difference is marked.

So far as my own collection is concerned many of my specimens would be better for potting on but I am restricted for space and have to leave them in the small pots and give a little top dressing from time to time, but it is surprising how long some will thrive and grow in the same pot year after year.

We now come to a very vexed question—"What is a typical plant?" and I expect the answer is, as found in its natural habitat, but there must be variations even in nature and the conditions under which the plant grows.

How much more so is this the case under artificial conditions and cuttings of my plant grown, we will say, in Manchester or Croydon I might hardly recognise after a season or two and one's own plants vary, too, according to the method of culture, etc., in different seasons and even on the same plant.

I have some pieces of *Con. exsertum*—or such I believe it to be—a piece of the original Sladen expedition plant found in Namaqualand some 25 years ago, and as such it was named by Dr. N. E. Brown; it is a scarecrow specimen with long woody stem. Seedlings from it vary greatly and variations can be seen even on the same plant. I have also a plant of *Con. cauliferum* and some of the heads of *Con. exsertum* run it pretty close although there are differences.

It has been stated that *Con. exsertum* never has stems but I cannot quite agree with this. Many of the so-called stemless Mesembryanthemums develop stems if they are old enough as seen in my ancient *Rimaria Heathii* and *Pleiospilos simulans*, and in both these it would be better to describe them as trunks rather than stems.

Then again, there are seedlings of *Con. Nevillei*—all from the same pod—which vary enormously, and all have been grown in the same pan; the same applies to *Lithops karasmontana*. My original plant was sent me some years before it was named as a new species from Van Rhynsdorp, and it was named by Dr. N. E. Brown in honour of Mr. Neville Pillans, as you are no doubt aware. Mr. N. S. Pillans, by the way, sent me the first plants of *Pleiospilos Bolusii* and *P. simulans* I ever had and very proud I was to possess them, as the latter at any rate was at that time quite rare.

Speaking of *P. simulans*, you all know that the flowers are described as sessile, or nearly so, and yellow, and Jacobsen in his book says a white-flowered variety has been seen here

and there and that this may be a separate species. So far as I am aware, however, the only white-flowered plants in cultivation were raised by myself and were a sport from an ordinary yellow, both colours being obtained from seeds from the same pod.

I had two or three of these pods and the seeds resulted in three or four white and the remainder yellow—they did not flower till in their fifth year.

I carefully hybridised the flowers and still yellow was predominant. I continued, and the last batch of seeds, now four years old, commenced to flower this autumn and out of 85 plants raised, 29 flowered and all were pure white so it looks as if the variety is at last fixed. Some of them have been distributed to Kew, Manchester and several private collectors.

I once had a plant with a deep orange flower but I lost it before I was ever able to get seeds.

I have a plant of *Antimima duale*, also one of the original Sladen plants, and during the 25 years or thereabouts I have had it, it has flowered once only after being in cultivation 18 years and it was from this flower that Dr. N. E. Brown made his drawing and wrote his description. It is a very slow grower and rarely divides; it has not been repotted for many years and next season I shall follow Mr. Griffin's recommendation and give a good shift on. It is a pretty rose magenta flower.

Phyllobolus resurgens was first described in the Transactions of the Royal Society of South Africa about thirty years ago, whether by Harry Bolus or his niece, then Miss Louisa Kensit, I am not quite sure, and although it has been in cultivation so long it is, I think, quite uncommon now; it dies down completely about the end of March and starts to "resurge" early in September. During the resting season it requires no water at all and behaves just like a bulb, but when growing it will take all the moisture you like to give it. With me it flowers every year about this time, but I have never had any seeds, probably because all my stock has come from the one plant.

I have here before me the letter from Dr. N. E. Brown, dated January 27th, 1933, asking me for a flowering plant which I sent him, but so far as I know he never figured it.

The raising of Mesembryanthemums from seed I find most fascinating, and it can easily be done by anyone having a greenhouse or a propagator with a little heat in autumn and winter, and in this connection I will again

quote a remark of Mr. Stuart Griffin in the last Journal.

He asks, "Do plants from South Africa grow in our summer or in theirs?" And the question arises as to when is the best time to sow seeds.

From my own observations I am convinced that seeds do best if started in the autumn here, and I have over and over again planted seeds early in the summer which have germinated not at all or in an unsatisfactory manner, whilst those planted in the late summer start quite quickly; very often they will remain dormant for months and then start when the proper season comes round.

I have observed another curious happening which is as follows:—a batch of seeds having germinated and reached the pricking out stage are transplanted, thereby disturbing the soil in which they may have been growing for a year or more when there follows another crop, and for this reason I never throw away the pot of old soil for some time.

I have a striking example of some plants of *P. simulans*; a large flowering specimen and a number of tiny ones were all sown in one pan at the same time and every time they were transplanted fresh seeds came up, and they were all from the same source, too.

I say also from my own experience that many plants root better and more quickly in September and later, than those in the earlier months.

It would be easy to go on for a long time talking about Mesembryanthemums, and there seems no end to the subject but time is passing and I must not bore you on this, my first appearance, but I cannot close without paying a tribute to my dear old friend, Dr. N. E. Brown. I knew him well since I was a lad, and I also knew his father-in-law, Mr. Cooper, and that is going back quite a while.

At the time of which I am speaking he was quite old and his memory was getting a little defective and he always carried his note book to which he referred when in doubt. He always wore a top hat and a short black cloak reaching to his knees, and even at that time of his life, spent a lot of time in the succulent house at Kew. He died at Richmond at a very advanced age, I believe.

Dr. Brown carried on his work almost to the end and the wonderful water colour drawings which he did himself were works of art; it was indeed a misfortune that he was unable to finish the work so well begun.

The last time I saw him, we had tea together in his bedroom and even though in very poor

health, he was full of his pet subject and looking forward to other work he had in mind.

He informed me in a letter in January 1933, in response to my enquiry, that he was given the title of Doctor of Science by Witwatersrand University by General Smuts at the request of South African botanists for work done in connection with the Cape Flora. This work will be ever remembered by all of us, and more especially by those who counted him as a friend.

Exhibition

The Exhibition will be held this year on June 21st and 22nd and the arrangements will be on the same lines as in previous years.

This will be the sixth successive year that an Exhibition has been arranged by the Society and it is hoped that members will do all they can to make it a success. It seems clear that such a show is appreciated; not only does it give people an opportunity to show their plants but it makes an excellent meeting place for members who do not come to London frequently, so that it is sincerely hoped that it will not have to be discontinued. But unless more entries are received it seems likely that the Exhibition may have to be dropped, for a year at least.

The use of the Royal Horticultural Society's Old Hall is granted on very advantageous terms to the Society, owing to its affiliation to the R.H.S., but it is expected that we will do our best to fill the Hall adequately and to make a show worthy of the traditions of Vincent Square. A special appeal was made last year but the result was not particularly encouraging; the actual number of exhibitors was slightly higher but the number of entries was less, and the majority of these entries were in the smaller classes. In fact, more than half the actual number of plants shown were contributed by five members only. It is realised that the transport of plants may present a serious problem to some people but much could be done if members living near each other combined together to arrange for a car; even if none of the members have a car, the cost of hiring one is not great, if shared.

If you are interested in the Exhibition, do your best to make some contribution towards it. It would be a great pity if this annual event had to be discontinued as it is our best opportunity of impressing the uninitiated with the attractiveness of succulent plants.

Rare Cacti and Their Cultivation

By Curt Backeberg

IN the development of the cactus cult, it has been evident for many years that interest in these plants goes up, down and up again; stagnation follows a flowering time and is, in turn, redeemed by another.

The cause seems to me clear. I believe the cactus cult to be really a rarity cult, which only attains its full development when the demand is greater than the supply, when a plant acquired as a rarity remains a rarity and is not, in a short time, available in quantity, so that specimens formerly valuable as rarities become valueless. With the onset of mass production comes devaluation of whole collections and then the interest of the true collector wanes. A real collector does not want "everybody's plants," but specimens which represent a certain value on account of rarity.

Mass production by a nurseryman does not therefore mean renewed vitality but is death to the cactus cult. "Flowering times" we have had only when a few experienced and enlightened growers have known how, with much love and care, to produce the desired specimens and how to offer them to the amateur. To the mass producer of to-day all names are the same; assortment and quantity bring business. The former "enlightened" grower, whom the books show us to have been a very competent judge of species, understood this thoroughly as far as the cactus cult was concerned.

It seems to me that we are again slowly approaching this sound basis of amateurism; mass production is on the wane and in certain countries it is left to a few inexperienced growers whom the amateur, in better times, will disregard.

At the same time, knowledge and ability on the part of the individual amateur is essential. Cacti are an unusually interesting and many-sided family of plants which may well be considered as one of the rarest, if not the rarest, family in the world; working amongst them offers much of interest and shows that amateurism, after a depression, has always risen again. Such an upward movement, however, cannot come, and the amateur can have no true pleasure in his plants, unless he really knows them, instead of (with no deep interest in the cacti) buying more or less correctly named plants in the hope that they will prove to be correctly

named . . . ! Still more must the amateur take control of his hobby; he must direct its course and set the level; he must be so experienced in knowing his plants that the grower has to take this into account and hold the stock that a true cult demands.

How do matters stand at present? Apart from a quite small number of experienced amateurs, who themselves make of their collections collections of rarities, amateurs as a whole consist of a number of plant lovers who all grow the same plants because the growers from whom they obtain their plants carry always the same assortment. Hence the revival of the cult is to be expected rather from the grower than from the amateur himself.

All this will be changed when the amateurs rise above their average level and become more enlightened and experienced. Then they will compel the grower to produce rare species in limited quantities but covering a large range. Without such a rise of the average level the grower dare not risk wasting valuable time in the production of plants that perhaps no one will buy, because no one knows of them . . . !

If such a change is to take place, it must be initiated by the amateur, then the basis for a cult, the basis of rarity, alone will count and serve as stimulus.

It has been assumed that so many rare species are available for growing and propagating that the present collections, in which individual items can always be changed, could be made into really choice collections.

Are there so many rare species that one can say that their cultivation is a great task for the amateur?

In this regard I must first say that we possess not dozens but hundreds of species which were once introduced in great quantities but which to-day have nearly died out in collections! They will be lost for a long time if the amateurs do not look after them! For there is little probability that collectors will be found, within a reasonable time, who will re-import them, since these collecting trips no longer pay.

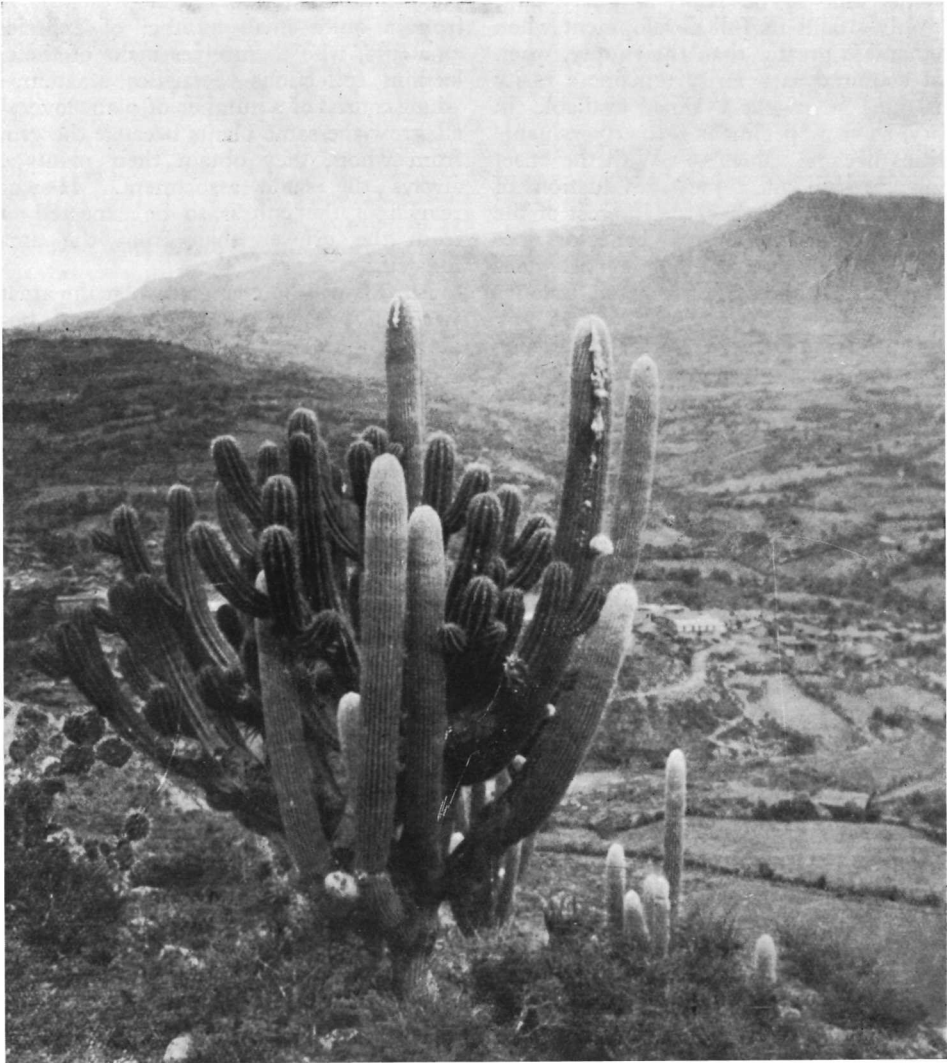
It is not only possible, but it is the duty of a cult to preserve these few rare specimens by inducing their possessors to propagate them. It is a profitable and important task for all lovers of succulent plants, systematically

and methodically to keep rarities alive in sufficient numbers, without throwing them on the market in quantity !

And besides this, there are so many rare species that one can say that, on the average, most collections contain only a fraction of them. I am in a position to judge for I have made it my business for many years, in the course of my work on Cactaceae, to track down the rare species and, to be quite honest,

undertaken to increase valuable individual specimens, it is hoped that this will become general amongst amateurs also.

We may well say that to-day the amount of living material is greater than ever before in the history of succulent growing ; species which were once sensations in collections, we now possess in dozens, the rarest genera and most unusual plants are brought over from their habitats, there are seeds of those species



Gymnanthocereus chlorocarpus and *Espostoa sericata* in their natural habitat.

I must say that in my collection dozens of rare species exist which I was the first to bring home from abroad and which have not been increased up till now. This fact permits me to write these lines ; and as I have

which have been lost and valuable cristates have been imported or originated anew in collections. It is a paradox that in a period when the living material has reached a greater height than ever before, amateurism has

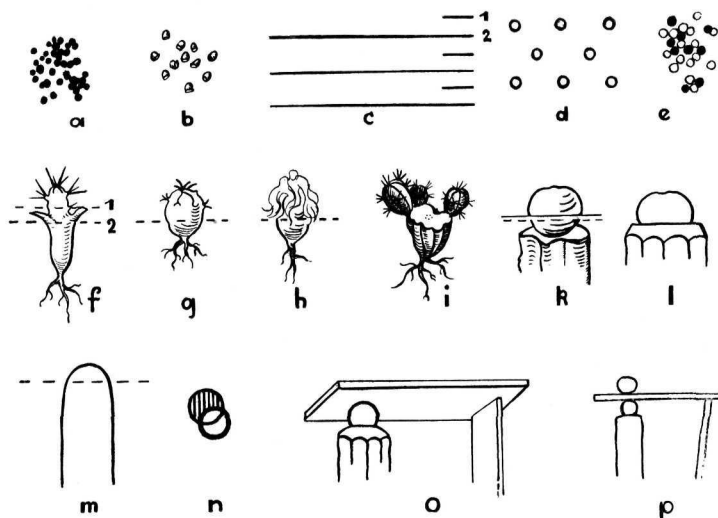
slipped, as is only too obvious, further and further into a state of stagnation.

This, in my opinion, is simply due to the fact that internationally nothing has been done to give amateurism a systematic and valuable standing on the basis of rarity. Of what use is all this trafficking in things botanical, this random description of novelties when, in the meantime, a dozen unique species die out and the cult as a whole goes backward. The cult must first be made strong and vital, then only can it carry on its botanical work! That is how I see it.

cult is available, if only it can be taken in hand methodically.

At the same time the amateur himself must see more in these plants than just remarkable children of Nature; he must go further into the special history and interesting details of this family of plants.

And then he must himself, systematically produce good specimens of the really rare species, by propagation and by raising seedlings. For example, what wonderful and satisfactory plants the *Parodias* are, and how great is the demand for plants of this genus.



Seed-sowing and Grafting (From B.f.K., 1934).

I have followed very critically the development of the last few years and, because I foresaw this, have published my "Bulletin for Cactus Research" so that the new species might be correctly described and established. None of the Journals had been able to publish new descriptions in sufficient numbers; otherwise amateurs would have been left with a large number of doubtful "garden names." So I systematically worked through one locality after another, to carry our knowledge of species still further. I did not hesitate to investigate regions with but few species, as this year in Ecuador, to complete this task. Thus I was able finally to clear up even genera which have been long in doubt, such as *Gymnanthocereus chlorocarpus*, which has been known as an illustration. I have also sought out rare species in other collections. Hence a basis for a successful revival of the

They can, however, only be increased very slowly. And who is raising them systematically from seed? Only a very few people. Patience and skill are necessary, which are, however, rewarded an hundredfold. And so it is with many other kinds too. Many rare species, as for instance, those from Chile, can only be increased slowly and with difficulty; they will always remain rarities. How little the wonderfully coloured *Cerei* of the High Andes have been distributed. And how large is the number of rare species amongst them!

In the Appendix to my B.f.K., in the calendar of operations, I have shown in pictures how to sow and to propagate seedlings by grafting. I should be delighted if these "tips" and my remarks on the systematic increase of rarities were to arouse enthusiasm amongst amateur growers. *Translated.*

Descriptions of *Conophytum* Species (Continued)

By Mrs. Louisa Bolus

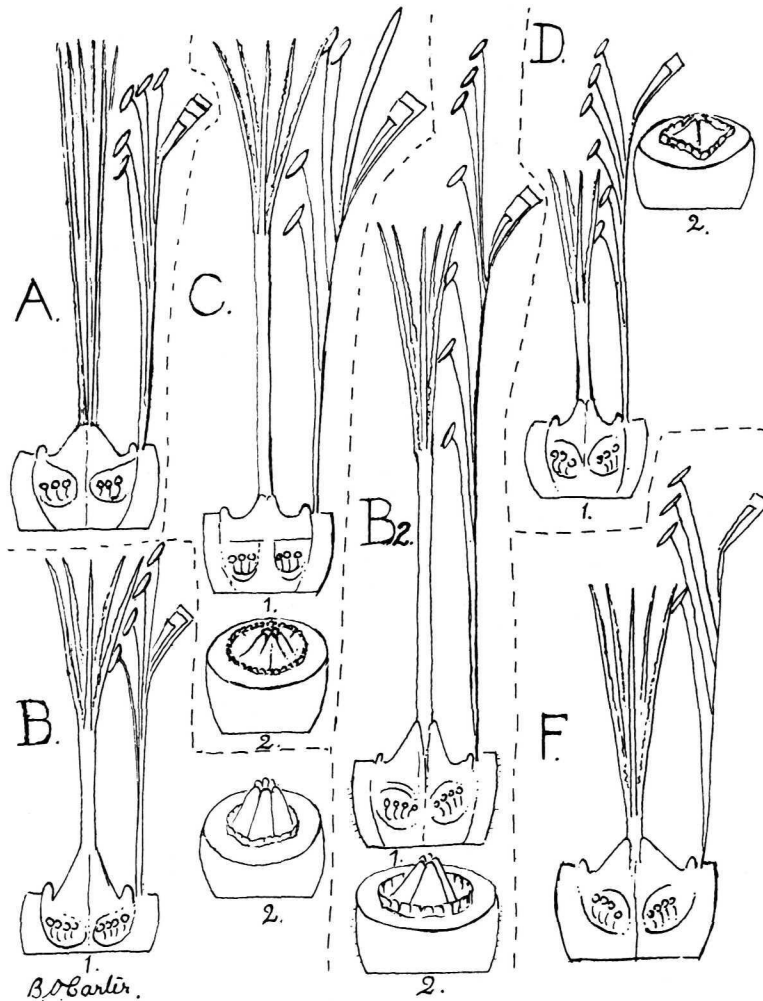


Plate 2a.

- A. *Conophytum lekkersingense* L.Bol.—Long. section through portion of fl. $\times 3$.
- B. *Conophytum Pole-Evansii* N.E.Br.—Fig. 1, long. section through portion of fl. ; 2, receptacle, disk, and ovary — $\times 3$.
- B2. *Conophytum citrinum* L.Bol.—Fig. 1, long. section through portion of fl. ; 2, receptacle, disk, and ovary — $\times 5$.
- C. *Conophytum diffforme* L.Bol.—Fig. 1, long. section through portion of fl. ; 2, receptacle, disk, and ovary — $\times 5$.
- D. *Conophytum parvulum* L.Bol.—Fig. 1, long. section through portion of fl. ; 2, receptacle, disk and ovary — $\times 5$.
- F. *Conophytum connatum* L.Bol.—Long. section through portion of fl. $\times 5$.

(NOTE.—The figures under B2 and D are for convenience included in this plate. The coloured drawings of *C. citrinum* and *C. parvulum* will appear in the plate which is to follow coloured plate published here and which also deals with yellow-flowered species of the section *Biloba*.)



Explanation of Coloured Plate

PLATE 2.—A. *Conophytum lekkersingense* L.Bol., ante p. 28 (1936).—This is a portion of the type-plant found at Lekkersing in the Richtersveld, Little Namaqualand. It is one of the handsome large-flowered *Conophyta*, and is a close ally of *C. Pole-Evansii* N.E.Br., figured below. Perhaps the most important difference is in the length of the style: in *C. lekkersingense* this is usually reduced to nothing, while in *C. Pole-Evansii* it is well developed. Other differences such as the exsertion of the ovary from the sheath, the notch in the lobes of the body near the apex, side view, the laterally compressed lobes of the body, less conspicuous pellucid area at apex of sheath, petals sometimes distinctly 4-seriate, and the flatter-topped fruit (except for the elevation in the centre), may not be constant. For in cultivation plants of this section (*Biloba*) often change in appearance, and one becomes more and more diffident in describing new species. It is probable that a considerable number of those already described will be reduced when a more prolonged study can be made, under perfectly natural conditions, of their various allies. It is interesting to note that both drawings, A and B, were made from plants at their first flowering (May–June 1936) after they were collected in the resting state by Mr. R. Smithers in September 1935.

Fig. 1, body; 2, do., opened, with part of fl., nat. size; 3, receptacle, disk and ovary $\times 4$; calyx, nat. size; 5, corolla-segments $\times 2$. See also plate 2a, A.

B. *Conophytum Pole-Evansii* N.E.Br., *Journ. Cact. and Succ. Soc.*, vol. 2, p. 429 (1931).—This plant (Bolus Herb. No. 21987) was found along the road from Port Nolloth to Steinkopf, at 28 miles from the former, almost on the border of the Richtersveld. The exact locality of the type is unknown. Our plant flowered freely and with 5 flowers open at one time was a fine sight, especially to those under the spell of this fascinating genus. Some of the flowers after several days of opening attained a diameter of 4 cm.

Fig. 1, body, opened, with part of fl.; 2, calyx, nat. size; 3, corolla-segments; 4, fruit, side view; 5, do., viewed from above, enlarged. See also plate 2a, B.

C. *Conophytum difforme* L.Bol., ante p. . . (1938).—The two branches represented are from separate plants collected at Remhoogte, in the Richtersveld, by Mr. H. Herre (S.U.G. 10178) and form the type. They flowered in April 1936. The leaves on one branch were all truncate at the apex, in side

view, while those on the other were obtuse or subtruncate or subacute. The flowers were alike and the plants appear to belong to a variable species having “difform” or differently formed leaves—perhaps due to cultivation. It is one of the medium-sized members of the section.

Fig. 1, body from branch on the left; 2, do., opened, with flower; 3, calyx, nat. size; 4, corolla-segments; 5, fruit, side view; 6, do., viewed from above, $\times 2$. See also plate 2a, C.

D. *Conophytum hians* N.E.Br., *Gard. Chron.*, vol. 81, p. 32 (1927).—The plant figured (Bolus Herb., No. 21989) was found by Mr. R. Smithers in September 1935 in the Richtersveld at Lekkersing, the same locality as the type, which was described without flowers. Our plant flowered freely in May 1936, and the bodies increased in size as the season advanced. In the earlier stages of the flower the stigmas were well exserted beyond the corolla, perhaps abnormally; but later, in the same flower, the corolla lengthened and reached the same level as the stigmas. In two flowers dissected and not depicted in the drawing, the ovary was found to be flattish or concave above with a slight elevation in the middle, and not as portrayed by the artist. In these flowers the style was barely to be seen and the stigmas reached a length of 5.25 mm.; stamens in 1–3 series with filaments up to 4 mm. and anthers up to 1.25 mm. long; orange-red corolla-segments 1–3 seriate, about 0.25 mm. broad.

Fig. 1, body, nat. size; 2, do., opened, with fl.; 3, calyx; 4, corolla-segments; 5, long. section through portion of fl., enlarged.

E. *Conophytum hahlenbergense* (Dinter) N.E.Br., *Gard. Chron.*, vol. 79, 30 (1926).—This species was discovered by Professor K. Dinter near Hahlenberg Railway Station in Great Namaqualand, and was originally described by him under *Mesembryanthemum*. The plant figured here flowered at Kirstenbosch (N.B.G. 2026/27) and was received from Mr. E. Rusch.

Fig. 1, body, opened, with portion of fl.; 2, calyx, nat. size; 3, corolla-segments; 4, long. section through portion of fl., enlarged.

F. *Conophytum connatum* L.Bol., ante p. 88 (1937).—The name of this species is in reference to the leaves being connate or nearly so. As a result of their being almost entirely united, the lobes are very short, and those represented in fig. 2 are unusually long for the species. This character taken together with

the velvety surface of the body, the strongly compressed ovary-lobes and the very short style, distinguish *C. connatum* from its close allies. In several instances 3 bodies were developed from the previous year's resting-sheath. The plant drawn was from a collection made by Mr. H. Herre (S.U.G. 8364) 28 miles from Port Nolloth on the road to Steinkopf, and flowered in the Stellenbosch University Gardens in April 1936.

Fig. 1, body; 2, do., opened, with part of fl., nat. size; 3, disk and upper part of ovary $\times 5$; 4, calyx, nat. size; 5, corolla-segments $\times 2$. See also plate 2a, F.

G. *Conophytum muscosipapillatum* Lavis, Mesemb. II, p. 379 (1933).—The type of this species was collected by Mr. H. Herre in 1929 on the Sandberge at Kommaggas, in Little Namaqualand, and was still in cultivation in Stellenbosch University Gardens in 1937. At first the arrangement of the papillae on the bodies suggested a moss-like appearance and the name, mossy-papillate, was given; but later this fancied resemblance disappeared and the papillae on the dots were uniform with those on the rest of the epidermis.

Fig. 1, portion of branch from an old plant; 2, body; 3, do., in flower, enclosed in previous year's sheath; 4, fl.; 5, calyx, nat. size; 6, corolla-segments $\times 2$; 7, long. section through portion of fl.; 8, portion of epidermis, enlarged.

For members who did not see the earlier contribution on this subject, it should be said that the references (ante . . .) are to *Notes on Mesembryanthemums and Allied Genera* by H. M. L. Bolus, Hon. Curator of the Bolus Herbarium, University of Cape Town. The first part of this work was published in 1928 and was illustrated in black and white and in colour; as the reserve stock was destroyed by fire, Part I is now difficult to obtain. Part II was issued in sections between November 1928 and February 1935 and is without illustrations. Part III is now appearing and it is the colour plates which are being published with it that we are able to present to our readers. Many other species and genera, some with black and white illustrations, are included in this important addition to the literature of Mesembryanthema.

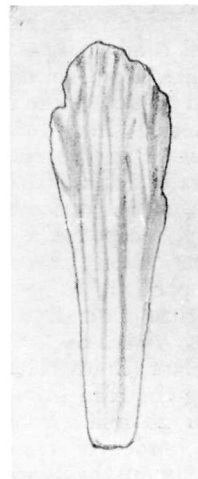
It is regretted that the page reference for *Conophytum difforme* on page 51 has not come to hand at the time of going to press; it will be given in the next number of the *Cactus Journal*—EDITOR.

Abnormal Behaviour in *Echeveria Hoveyi*

By H. Hall

EARLY in the spring of 1937 some plants of the well-known *Echeveria Hoveyi* were beheaded, owing to their rather unsightly legginess, a normal sign of old age. Cutting the heads off is, of course, the usual method of propagation, as is the removal of the side shoots which form on the old stems if required for similar purposes. Incidentally, a much finer plant is obtained for several years when the top is established.

The plants in collections under this name, so far as it has been possible to ascertain, have whitish and grey-green leaves, with the familiar waxy "bloom" so characteristic of most *Echeverias*. These leaves are several times longer than broad and almost invariably



Leaf of *Echeveria Hoveyi*.

possess irregular marginal indentations, especially near the tips. More noticeable still is their attractive variegation in the form of pale, longitudinal streaks, these likewise being very irregular and varying greatly in different leaves, some having no green colour whatever. They are extremely brittle and in consequence very prone to injury.

There is another species here under the name of *Ech. Zahnii* which is considered to be rare in cultivation. Until about a year ago we had only one specimen but some pest or other very opportunely injured the growing-point, which promptly caused it to shoot out new

branches in all directions ! This plant makes a symmetrical rosette of leaves which are the usual grey-green, but with almost invisible pinkish flecks here and there on the upper surface. I have never met with the name in any book of reference but have ascertained that the original plant was sent from Cambridge many years ago.

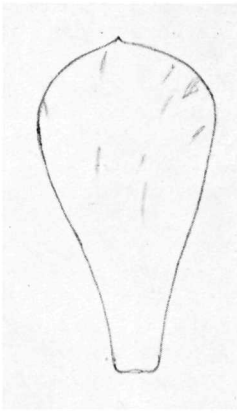
This reference to *Ech. Zahnii* is not so irrelevant as it may seem and as will be proved anon.

The old stumps of *Ech. Hoveyi* were retained for propagation purposes and side-shoots soon made their appearance. On one solitary specimen several shoots developed with entirely non-variegated leaves besides

found by the veins which give them a very skeletonous appearance.

Variegation is considered to be a weakness for some reason or other, yet we have many very charming plants through it. One type is a kind of disease which can actually be transmitted to a normal green plant, in special instances.

As it is, therefore, so invariably a mere colour-form of some original green parent one is compelled to reflect whether the well-known *Ech. Hoveyi* is but a variegated form which occurred ages ago and, being undoubtedly

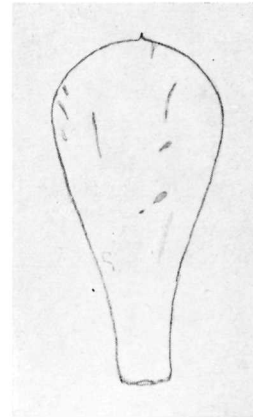


Leaf of *Echeveria Zahnii*.

many ordinary variegated shoots. The green leaves were shorter and broader than the parent and without the characteristic marginal indentations. As these new plants developed, having been removed and potted, they became identical in every way with the plant we have as *Ech. Zahnii*, resembling their parent not at all !

From a scientific viewpoint mere leaf-variation is not considered to be an important factor in classifying plants, but it is more than strange that these new forms should develop the same tiny, pinkish flecks that are seen on *Ech. Zahnii*. Strictly speaking, these are elongated depressions minus the green colouring matter known as chlorophyll, without which no plant could exist.

Variegation in plants is a very common occurrence and hundreds of examples could be given. In all cases it is caused by the absence of chlorophyll, except for those isolated cases where the pale colour is caused by air spaces in the epidermal cells. In some varieties of *Caladium* the chlorophyll is only



Leaf of *Echeveria Hoveyi* (Green form)

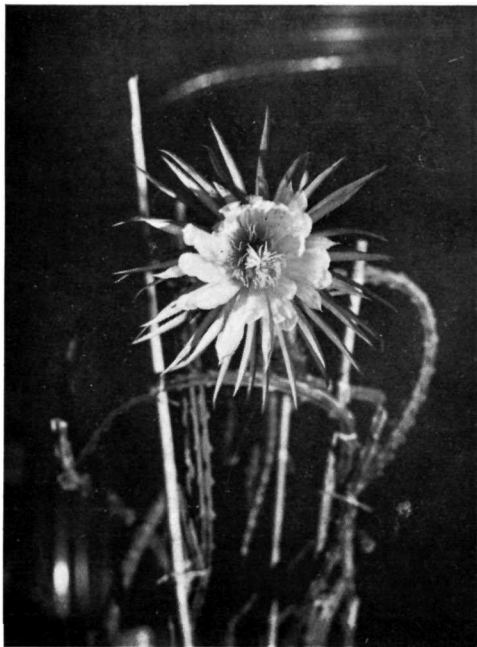
more attractive than the original, has been cultivated in preference, and to the complete exclusion of it. Plants revert to type very often. Is that what our *Ech. Hoveyi* has done ? But why isn't it called *Ech. Hoveyi variegata* like all the other variegated things ?

Neither of the two species mentioned here has flowered in Manchester though most other species of *Echeveria* do. It has been impossible, therefore, to make a comparison of the flowers, which is the only accurate method of determining their possible relationship.

Articles on subjects of interest to readers of the Journal are welcomed, as well as photographs suitable for reproduction. The Journal appears quarterly on the first of March, June, September and December, and matter to be included should be received, if possible, at least a month before the issue in which it is intended to appear. All communications should be addressed to the Editor : Mrs. Vera Higgins, M.A., 28, Northampton Road, Croydon, Surrey.

A Curiosity

A night-flowering *Cereus* high up on a greenhouse shelf in Windermere was considered by a blackbird to be a suitable site for a nest, and here four babies were duly hatched and reared.



That the plant suffered no harm is evidenced by the fact that a fortnight later it produced the beautiful flower shown in the second photograph.

Page Fifty-four

Report of the Council for 1937

THE Council have to report that sixty-one new members have joined during the year, seven fewer than in the previous year. But against this increase must be set the losses; six members have died, nineteen have resigned and twenty-seven have been removed owing to non-payment of subscriptions. This leaves a total of 376, nine more members than last year. Of this total, thirteen are Associates; this class, except for those who joined before 1937, is now confined to second members of a family, of which one person is already a full member.

The *Cactus Journal* is now in its sixth volume; it has been possible to arrange for the inclusion of coloured plates from time to time. Members are reminded that contributions of articles and photographs are welcomed.

The Meetings have been continued through the year and the Council would like to thank those people who have kindly given talks, as follows:—

- April Mr. P. V. Collings. "Preparing and Staging Plants for Exhibition."
- November Mr. Stuart Griffin. "Pots, Potting and Pottering."
- December Dr. Rodier Heath. "Mainly Mesembryanthemums."

The other Meetings were devoted to discussions and the exhibition of plants.

The fifth Cactus Exhibition was held in June on the same lines as in previous years. The number of members who take an active part is still very low and if the exhibition is to be continued as an annual event, more enthusiasm must be shown and the number of entries increased.

The Library has been increased by the addition of a number of books by gift and purchase, and the Journals of kindred Societies abroad are regularly received. The loaning of books by post now fills a considerable part of the Librarian's time and it is felt that this service may be of great use to members who cannot attend the meetings. It is hoped, however, that people will realise that there is a waiting list for most of the books and will not keep them too long.

The Council would like to thank the authorities of the Royal Horticultural Society for their generous assistance in a number of ways and also the Press for their kindness in publishing notices of the Society's activities and other matters of interest to Cactus growers.

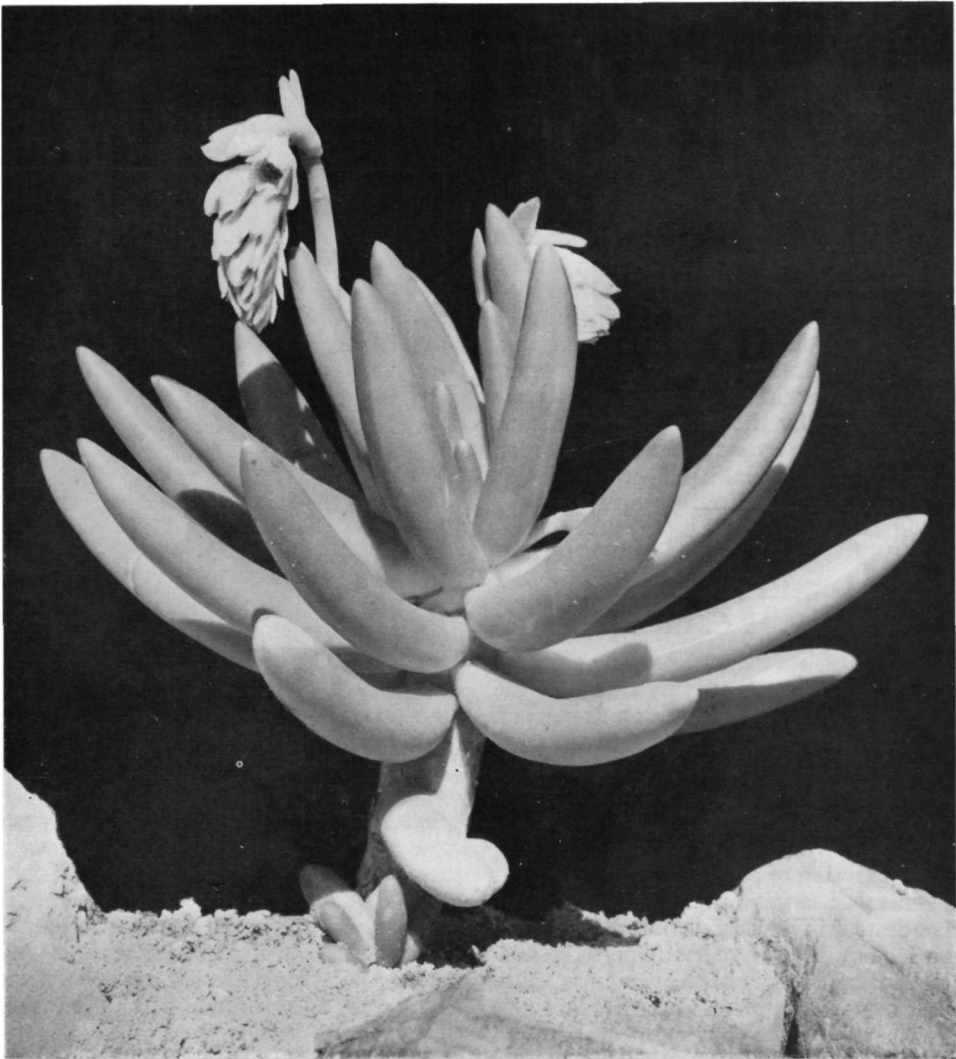
Pachyphytum Viride E. Walth.

By Dr. Karl von Poellnitz

Oberlödla, bei Altenburg, Thüringen

IN this periodical (Vol. V [1937] 72) I published a short description of the genus *Pachyphytum* Lk. Kl. et Otto. Meanwhile Mr. E. Walther, of San Francisco, California, published the new *Pachyphytum viride* in *Cact. and Succ. Journ. of America* VIII (1937) 210, with figures. Mr. J. R. Brown, of Pasadena, California, sent me the

viride, which is now growing in the Botanic Garden, Kiel. Using the original description, this new species may be described as follows : Stem mostly simple, brownish, up to about 3 cm. or more across, about 10 cm. long. Leaves 12-20, rather closely arranged at the tip of the stem, rather yellowish green, not pruinose, widely spreading, a little curved



Pachyphytum viride.

very fine photograph of this new species, which is here published. And in December 1937 Mr. Ferdinand Schmoll, of Cadereyta, Qro, Mexico, sent me a plant of *Pachyphytum*

upwards at the tip, obtusish, narrowed at the base, semi-terete, the face flattened, 8-14 cm. long, $1\frac{1}{2}$ - $2\frac{1}{2}$ cm. broad, $1-1\frac{3}{4}$ cm. across. Peduncle simple, ascending, 10-17 cm. long.

Lower bracts elliptic-oblong, leaflike, but the face more flattened, up to $3\frac{1}{2}$ cm. long, a little broader than the leaves. Raceme at first very nodding, with about 15 flowers, up to more than 9 cm. long. Pedicels valid, 2-3 mm. long, their bracts broadly ovate, thin, with the back indistinctly keeled, sub-acute, up to 3 cm. long, 18 mm. broad, light green tinged with red, densely imbricate. Sepals longer than the petals, adpressed to them, erect, unequal, light green tinged towards the tip, nearly white at the base, up to 18 mm. long. Petals spreading above the middle, 12 mm. long, face red towards the tip, green on the margins, back rose-coloured. Scales at the base of the epipetalous stamens red, distinct. Stamens red towards the tip, 11 mm. long. Carpels yellow, erect, widely spreading later; stigmas red, short. Honey scales straw yellow, obliquely truncate, up to 3 mm. broad.

Mexico: Collector and locality unknown; type plants sent to California by Ferdinand Schmolli, of Cadereyta. This new species belongs to the Section *Eu-Pachyphytum* Berger; in my Key (1.c.72) it must be placed beside *Pachyphytum oviferum* C. A. Purpus, but this species has very much shorter and relatively broader leaves, etc.; our new species is distinguished from *Pachyphytum brevifolium* Rose by the same characteristics. The type of *Pachyphytum viride* is Californian Academy of Science No. 242,615.

An Easy Way of Recording Cacti and Succulents

By the Rev. F. C. Champion

One of the easiest ways of keeping a record of cacti in your collection is by means of the card index system. Cards, index and box can all be bought nowadays at Woolworths. I find this system answers much better than a book; it enables species to be indexed up; a full account of the specimen can be recorded, viz., where purchased, date, time of first flower, description of plant, etc., together with some general observations. A card is an easy thing to destroy if you make a mistake, whereas a book looks untidy if it has many crossings out and corrections. Moreover a separate card can be taken into the Cactus House and easily checked up and it saves hunting through pages of a book to find this or that specimen. Such a record provides work for the winter, when we usually wander into the Cactus House almost on tip-toe lest we disturb our fascinating, if rather spiny, children from their quiet winter sleep.

Haworthia Woolleyi v.P.

By Dr. Karl von Poellnitz

The photograph shows the type plant of this very interesting species, of which the description appeared in Fedde's *Repertorium* XLII (1937) 269.

Rosette acaulescent, ca. 7-10 cm. across, very proliferous from the base, soon caespitose, many-leaved. Leaves ovate-lanceolate, very acuminate, recurved or more seldom nearly horizontal at the tip, very often somewhat curved like a sickle towards the tip, not shining, about 6-8 cm. long, about 12-20 mm. broad towards the base; face sub-concave, smooth, light green, with some dark green,



Haworthia Woolleyi.

often interrupted, scarcely or only irregularly anastomosing lines; back dark green, very convex, obtusely and obliquely keeled, with tubercles arranged in often curved or undulate cross rows, or confluent to such cross rows, these tubercles dark green, not shining, only a little shining (and therefore lighter in the photograph) at their tips, at first often a little lighter; leaf tip scarcely with a minute mucro; margins with solitary, mostly remote, dark green teeth a little lighter at their tips and up to about 1 mm. long.

Cape Colony: Springbok Flats, Steytlerville, growing in dense clumps under bushes and rocks, leg. C. H. F. Woolley (=Long 440, type). Near *Haworthia venosa* (Lam.) Haw., but leaves otherwise marked.—Type cultivated in the Botanic Garden, Dahlem.

More about Raising Cacti from Seed

By A. Boarder

MEMBERS may be interested to know the result of my offer to give seed of a *Mammillaria* for trial. Up to the present, 51 members have applied for seed, and it has been a real pleasure to send the seed out. There have been twice as many applicants than there were in 1935, when I made a similar offer; although an increase in the former numbers, it seems strange that over 300 of our members did not avail themselves of the offer. Why is this? Is it because members have no room or convenience? Hardly that, I should imagine, as the seed could all be sown in a small pot and kept covered in a sunny window, if no greenhouse is available. I really think that the majority of members have either tried unsuccessfully in the past to raise cacti from seed, or they are of the opinion that it is a very slow job to get a plant of any size. I know that it can be a very long job, if conditions are not satisfactory, but it is possible to obtain a nice plant in two or three years, and one that flowers, too.

I first started to think seriously of raising cacti from seed in 1927. I had a friend who was importing good-sized plants from abroad and the price of them appeared so prohibitive to me that I realised that unless there was some other way I should never be able to obtain all the plants I wanted. I therefore turned to seed raising. My friend laughed at me when I suggested trying out some of the seed from his plants and said that he couldn't wait for that. Not discouraged, I tried a few seeds and soon found that, although I had many disappointments, I later achieved a fair amount of success. At the present time, my collection has a large majority of plants in it that I have raised from seed myself.

From the number of letters of enquiry I receive from members about seed raising, I think that a few more notes on it will be helpful. I hope that older members will forgive me if I appear to be running over old ground again, but so many of our new members are keen on seed raising that I may be forgiven.

To begin with, I do not think one can better seed pans for sowing in, although boxes are a good substitute. I do not mean those shallow seed boxes one sees in a nurseryman's, but a box at least four inches in depth. The pans or boxes should be divided up by means of strips of glass, and a compartment of one inch

square is quite sufficient for an ordinary portion of seed, say up to a score.

The soil should be sweet and porous. A mixture of good loam, sharp sand and fine charcoal will do for a beginning. Place drainage in the pans to almost a third of its depth, using charcoal or broken brick. See that the top soil is fine and then thoroughly soak in Cheshunt Compound or some other steriliser against damping off; this is imperative. Sprinkle the seed on the top of the soil and do not cover it, only press in large seeds like *Cereus*, etc. Mark each kind distinctly; I find pencil on celluloid labels lasts very well. It is advisable to cover the pans with shaded glass until germination takes place, and even then the seedlings should not have the direct rays of the sun. The pans should be placed over hot water pipes or in a special frame which can be heated to at least 70° F. If this temperature cannot be maintained in the early part of the year, it is better to delay sowing until April. Good seed will germinate if kept warm and moist, and the rate of germination will depend on the temperature. Seed of *Stapelia*s will often germinate inside forty-eight hours, and *Mammillaria*s from five to ten days, depending on the warmth. Most cactus seed will germinate in a week in a temperature of 80° F. if kept moist.

The best way of watering is by immersing the pans in trays of water until they are soaked, but do not be tempted to keep the pans continually in trays of water; if you do you will find the seedlings rot off. Do not allow the seed pans to dry out as, although this will not kill the small seedlings, it tends to check their growth.

When the seedlings are up and showing tiny spine formation, it is essential to give more air than has been necessary for germination. So many plants are lost at this stage by too close an atmosphere. Another watering with Cheshunt Compound is advisable a month after sowing, and at any time should any signs of damping off appear.

Do not be in a hurry to shift the seedlings. They do not mind being crowded, they love it. Wait until they are small cacti and not tiny balls of water, which is really only the cotyledon stage. As long as they thrive, leave them where they are. When you do move them, do not put them into tiny flower pots; any pot under 1½ inches in diameter is worse than useless. Prick out the seedlings

in another pan or box, say one inch apart. For this transfer, use a slightly coarser compost and add a little limax or old mortar rubble. Water again thoroughly with Cheshunt Compound and then do not water again until fairly dry. It is in this stage of seed raising that many plants are lost unless one is very careful. The tiny rootlets are so easily damaged and the plants will rot off if too wet.

Once they are rooted and growing they may be watered as often as they dry out. Still keep partially shaded and not too far from the glass. Under this treatment they will soon make nice plants. Do not shift again until the plants almost touch each other, then pot in, say, two-inch pots. Keep dry after potting for a fortnight, then grow on as you would ordinary plants. Forget all about growing cacti in tiny pots but, as fast as the plants reach the side of the pot, transplant into a larger one. The larger the pot within reason, the better will be the growth, and it will not interfere with flowering, for I have flowered seedlings in a prick-out box. Under these conditions I have grown and flowered plants of almost all genera. Many Mesembryanthemums, Stapelias and Mammillarias have flowered for me the year after the seed was sown, and many Echinocacti in three years. Although I have now mainly Mammillarias, I have in the last ten years raised plants from seed of most of the genera in cultivation. If the above directions are carried out, success should be certain, but omission of any detail may easily bring failure.

Letters to the Editor

"Being one of the recipients of Mr. Boarder's original offer of seed, I agree with the idea that we should send a brief account of our experiences, not because I have been successful (far from it), but it does help to hear how others have fared in similar circumstances. Here is mine:—

"I received the seed on January 25th, 1935, and sowed it the following day. No note appears to have been made of the date of germination, but I raised seven seedlings, and thought I was doing very well until I read Mr. Boarder's note in the December Journal. This took all the wind out of my sails, as my plants, even at this date, are not more than 1 in. in diameter. Perhaps I have been too cautious in regard to potting compost, owing to being a 'lone' grower, but small as they are, they are good to look at and well worth

the experiment. I intend potting them into a richer compost in spring.

"Mr. Boarder's present offer of seeds came to hand on January 4th and they were sown on the 5th. On January 19th the first seedling appeared and to-day, February 3rd, I have 18 through, which I think is very satisfactory. With my previous experience to work on, I hope to be able to grow them sufficiently well to exhibit at some future show.

"I do hope some of those who received seeds will send along their adventures in the realms of growing cacti from seed." L. BULMER.

"With reference to Mr. Bullock's reply to my letter, I had always felt that *Lithops* should be masculine, but both Dr. N. E. Brown and Dr. L. Bolus assured me that it was *not* and an eminent classical scholar assures me that it need not be. In any case it has been published as feminine.

"While realising that botanists have a great deal of licence, there is surely no need for them to use *quite* such abominable 'Dog-Latin' as 'genitive plural nouns': there is a declinable adjective 'summitatus' meaning 'appertaining to, or coming from the heights' and the South Africans now use *Lithops summitata*. The family name of Farmer E. Rusch, of Lichtenstein bei Windhoek, should be third declension with a genitive plural—Ruschium.

"Dr. Bolus herself wrote to me that the genus *Menticalyx* had been discarded: what is the unfortunate amateur enthusiast to do if botanists disagree and there is no final authority?" H. J. DUNNE COOKE.

Haworthia Blackburniae

Mrs. Blackburn of South Africa recently discovered two new *Haworthias*. One of these of the *Retusae* section, after the style of *H. mirabilis*, was sent to Dr. Karl von Poellnitz, who named it after her—*Haworthia Blackburniae* v.P. The other one she sent to Kirstenbosch (the Kew of South Africa) and Miss Barker there named it after Mrs. Blackburn and put it into a special section of its own. We therefore have two different species with the same name and both named about the same time, viz.:

H. Blackburniae v.P., section *Retusae*.

H. Blackburniae Barker, section *Fusifforme*. The latter plant does not look like a *Haworthia*, the leaves have the style of growth of a small Hyacinth, but we are assured from South Africa that the flowers are the usual ones of *Haworthia*.

Book Reviews

CACTI, a Gardener's Handbook for their Identification and Cultivation, by Prof. J. Borg, M.A., M.D.; published by Macmillan and Co.; price 21s.

How often have cactus growers wished there was some book which gave descriptions of the many species of cacti which are to be found in cultivation. The great Monograph by Britton and Rose has long been out of print; we are much indebted to the enthusiasm and courage of the American Cactus Society that has made the reprint of THE CACTACEAE possible but this work is still expensive and its four volumes, written largely for the botanist, are somewhat overwhelming for the novice.

But now Prof. Borg has given us just what was wanted. In CACTI, the main portion of the book is devoted to the descriptions of some 1187 species of cacti and their varieties; moreover these descriptions are very clear and technical terms have been avoided as far as possible. The descriptions are arranged according to the system given by Britton and Rose, with the addition of new genera discovered since 1923; these are *Arthroocereus* Bgr., *Aztekium* Boed., *Epiphyllanthus* Bgr., *Erythrorhopsis* Bgr., *Friesia* Fric, *Haageocereus* Bckbg., *Microspermia* Fric or *Parodia* Speg., *Neowerdermannia* Fric, *Notocactus* Bgr., *Obregonia* Fric, *Porfiria* Boed., *Pyrrhocactus* Bgr. Certain others have been proposed but their validity is still somewhat doubtful so that such genera as *Armatocereus*, *Brittonia*, *Islaya*, *Mediolobivia*, *Pseudoespostoa* and *Spegazzinia* have been omitted. The recently proposed classification of Curt Backeberg has much to recommend it but Prof. Borg feels that at the moment "it offers much scope for controversy, and will very likely have to be considerably modified before general acceptance."

With every description of a species are given the chief synonyms, the locality from whence it comes and cultural details where necessary. The various types of cacti are well shown in forty-six plates, each containing two photographs.

Preliminary chapters deal with the external form of cacti, the regions where they occur and the climatic conditions under which the various types grow. There are also useful chapters on soil, potting, watering, seed sowing, cuttings, grafting and hybridisation. With regard to the cultural directions, Prof. Borg lives in Malta and grows his plants under

much more favourable conditions than we do in this country; the "glass sheds" of which he speaks would not be of great use here, but he has not forgotten that many of his readers will be living farther north than he does. A particularly useful section will be found at the end of the book where the requirements of the various types are summarised under the Tribes and Sub-Tribes to which they belong.

The spelling of plant names is always a difficult subject for the gardener, and though the International Rules may not be perfect, the best hope of producing order out of chaos is to follow these Rules as closely as may be. Though American botanists have concurred with the findings of the International Rules Committee on most points and the American Code has been abandoned, some American botanists do still spell all specific names of plants with a small letter; according to the Rules, those derived from the names of persons or genera should be spelt with a capital initial letter; Prof. Borg seems to have chosen a method half way between, for he writes *Wilcoxia Poselgeri* but *Echinocereus poselgerianus*, considering the specific name to be purely adjectival in the latter case.

A more serious difficulty is presented by the use throughout of the Centigrade scale of temperatures; though in general use on the Continent, in English-speaking countries the Fahrenheit scale is far more common, in fact it is used exclusively in this country and in America for ordinary purposes. (For scientific work the Centigrade scale is almost universal.) A gardener may well be forgiven if he wonders what is expected of him when he is told that "in winter the temperature in the shed may go down to 7° or 6°C." Perhaps, in a second edition, we may have a comparative table of the Centigrade and Fahrenheit scales; in the meantime readers must do their own arithmetic by the equation °F.=9/5 °C.+32°.

The task Prof. Borg set himself was no light one, nor has it been lightly undertaken; the result is one of the most useful books on Cacti in the English language, one which no cactus grower can afford to miss.

BLUEHENDE KAKTEEN UND ANDERE SUK-
KULENTE PFLANZEN, by Dr. Erich
Werdermann; published in parts by
J. Neumann, Neudamm.

Part 34 of this excellent work contains beautiful coloured plates and full descriptions of four cacti from South America. *Borziacactus plagiostoma* (Vaupel) Br. & R. is a tall-growing plant with scarlet flowers from North Peru;

it was discovered in 1904 but the first living plants were not introduced till 1931. *Thrixanthocereus Blossfeldiorum* (Werd.) Bckbg. is also columnar and the yellow flowers arise from a lateral cephalium. *Acanthocalycium violaceum* (Werd.) Bckbg. (previously *Echinopsis violacea*) was discovered in 1930; the flowers are pink at first, becoming more violet coloured, and last several days. *Echinocactus bulbocalyx* Werd. is a new species sent back from Argentina some six or seven years ago; its generic relationship is still not clear; the spines are stout, loosely surrounding the plant and the flowers are yellow.

Annual Meeting, 1938

The Annual Meeting of the Society was held on January 25th, 1938, with Dr. Marrable in the chair. The Report of the Council (see p. 54) and the Balance Sheet were presented and adopted. The Officers and Committee for the ensuing year were then elected. Lord Mansfield was unanimously re-elected President; Mrs. Vera Higgins was reappointed Hon. Secretary and Editor, but Mr. Haddon wished to retire from the Treasurership, owing to pressure of other work; in his place Mr. C. Clarke was elected Hon. Treasurer. Mr. Haddon was warmly thanked for his services during the five years that he has held the office. Mr. Rapp was reappointed auditor. The members due to retire from the Council were Mr. Denton, Mr. Farden and Mr. Lloyd, and under the amended rules, they were not re-eligible for one year. To fill the vacancies, Mr. Haddon, Mrs. J. A. Russell and Mr. B. S. Williams were proposed and elected. The Society also elected its first Honorary Member—Mr. R. S. Farden; Mr. Farden was a member of the preliminary committee set up to consider the formation of a society and has been Chairman of the Council until 1937, when he asked to be allowed to retire; his interest in the welfare of the Society is well known.

At the conclusion of the business, the Chairman said that, though the Report for the year was satisfactory, he felt that members were not taking so active a part in the work of the Society as could have been hoped; the Cactus Exhibition was not well supported and, though the Journal was apparently appreciated, few people sent in contributions unless definitely approached. He urged that all members should play their part in ensuring the healthy progress of the Society.

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Meetings

Meetings will be held on the following dates in 1938 :—

March 22nd

May 10th.

June 8th (Wednesday).

June 21st

June 22nd } EXHIBITION

July 19th.

September 13th.

October 11th.

November 29th.

Fixtures :—

March 22nd. Dr. H. T. Marrable will give a talk on "Euphorbias."

May 10th. Discussion on "Variation in Plants of the same Species." It is proposed to discuss, amongst others, *Mammillaria plumosa*, *Aloe variegata*, *Cereus peruvianus* and *Euphorbia meloformis*, and it is hoped that as many members as possible will bring specimens for comparison.

The outstanding Botanical Work of 1938

Recognised throughout the world as the cactophile's bible, **The Cactaceae**, by Britton & Rose, has been out of print for twenty years ; copies of the original edition, when available, are sold for as much as £80. Now the Cactus and Succulent Society of America has sponsored a reprint of this invaluable work, making it once more available to the public.

THE CACTACEAE

By N. L. BRITTON and J. N. ROSE

A reprint of the original edition by the Cactus and Succulent Society of America, in four volumes, 1048 pages 9 in. by 12 in., 127 one-colour reproductions from the original coloured plates, 1120 additional illustrations.

"Britton & Rose" is too well known in the botanical world to need eulogy. The reprint, carefully carried out by the American Cactus & Succulent Society, exactly follows the original text. It is, of course, the only complete work on cacti in the English language, and is one of the most painstaking botanical studies ever written. The book is a necessity to Botanists, Students, Collectors and Culturists, containing 7800 cactus names, complete with descriptions, keys, indices and thousands of synonyms.

The production of the work is worthy of the text. The four volumes are bound in heavy board, with art linen covers, gold stamped. The printing was done at the well-known Abbey San Encino Press, Pasadena, under the expert direction of Scott E. Haselton, the well-known American cactophile.

It is confidently anticipated that the reprint will find a ready sale, and as the edition now offered is limited to 500 sets, early reservation is desirable.

THE CACTACEAE—"The Cactophile's Bible"—was first published by the Carnegie Institution twenty years ago. The volumes now offered are textual copies of the original volumes, but contain one-colour illustrations. The work is **quite complete** in every detail.

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THE CACTUS JOURNAL

Vol. 6, No. 4.

JUNE, 1938

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Welwitschia mirabilis, male plant.

Welwitschia Mirabilis Hook.

By Wm. Triebner

ONE of the most interesting plants of the west coast of Africa is *Welwitschia mirabilis* Hook., which belongs to the family Gnetaceae. Its range of distribution is restricted to a narrow belt, a quarter of a mile wide, some 30-60 miles inland from the coast, from Cape Negro to Swakopmund. It was discovered in 1860 by the Austrian botanist, Fr. Welwitsch, near Mossamades (Portuguese Angola) and described by Hooker in 1863 when it aroused great interest in the botanical world on account of its pinecone-like fruits. For this reason it was for many years regarded as one of the Conifers, but later proved to be the one representative

in the south-west of the Gnetaceae, which is closely allied to the Conifers.

Beside the two cotyledons, which later dry up, *Welwitschia* develops during its whole life only two leaves, which continue to grow at the base. Usually these are so torn by the wind that it looks as if more leaves were present. The root of the plant may be as much as 80 cm. across; the largest specimen of a *Welwitschia* that I know is 80 miles north of Zessfontein in the Kaokoveld, in northern South West Africa; the diameter at the base of the leaves is 163 cm. and their length 280 cm. The height of the plant is 193 cm. The roots go down some 8 meters.

The plant grows not only on sandy plains like the *Welwitschias* in the south western Namib, but also on granite mountains as at Brandberg in the northern Namib.

Welwitschias are dioecious, the male plants preponderating in a proportion of 3 : 1. The female plants produce much seed, which, however, is almost all destroyed by a kind of bug, so that young plants are seldom found. In their native habitat also, the plants are badly attacked by smut (one of the Fungi) which kills thousands, so that their number is gradually decreasing. In its most southerly locality, in the Namib, at *Welwitschia-Haighamkab*, about half the plants have succumbed in the last ten years.

The raising of *Welwitschias* from seed is easy by the right methods. The seeds are soaked over night in water at blood heat and sown the next day in light sandy soil in drain pipes, so as to give sufficient depth for the development of the long roots. The seeds

Exhibition

The Annual Exhibition will be held on June 21st and 22nd and it is hoped that as many people as possible will send plants so that there may be a bigger and better show than before.

Those who have exhibited on previous occasions are urged to do so again, and it is hoped that there will be many newcomers. There are classes for all sized collections.

Last year the classes for Succulent Plants, as distinct from Cacti, were very badly filled, and yet many people are interested in the aloes, haworthias, cotyledons, echeverias, stapelias, etc. Perhaps this year there will be a better show in these classes.

The Exhibition is arranged for the benefit of the members ; it involves a certain amount of work on the part of the officers but cannot be really successful without the whole-hearted support of the members themselves.



Welwitschia mirabilis, female plant.

grow in 6-8 days with a 90 per cent. germination and the seedlings develop fairly quickly in a warm place. They should be kept dry and protected from frost in winter and arouse the interest of all plant-lovers. Three- to four-year-old plants begin to flower freely.

Welwitschia mirabilis is protected by law and the export of plants prohibited. By special permit botanic gardens may receive plants. But this is not to be encouraged, for such plants are doomed to die and endure only for a few weeks, for the long tap roots cannot be dug up without damage. Therefore, only the raising of plants from seed can be recommended.

(Translated.)

Haworthia Blackburniae

Last month we announced that there were two new species of *Haworthia*, both under the above name. Dr. Karl von Poellnitz named the second one, that in the *Retusae* section, and he has now changed the name to *Haworthia correcta*.

Another item of *Haworthia* news :—Dr. von Poellnitz, in 1937, made a new section *Firmae* for the species *H. Starkiana* and *H. Lateganae* ; he has revised them this year and has rejected this section and transferred the two species to the section *Scabrae*.

R. S. F.

Melocactus Depressus

By F. H. Rodier Heath

THE subject of these notes was, at the time I collected it, viz., about thirty-five years ago, quite rare in collections, and even now it is not often seen although, following the efforts of importers, it is sometimes on the market.

From time to time specimens of this and the larger members of the family have been

tions of plants a foot in diameter have been given, I never saw myself any which exceeded six inches or so when fully grown.

Owing to a mishap to a steamer on which I was travelling from the upper reaches of the River Amazon, I found myself in the little known town of Natal, situated on the Rio Grande do Norte on the east coast of South

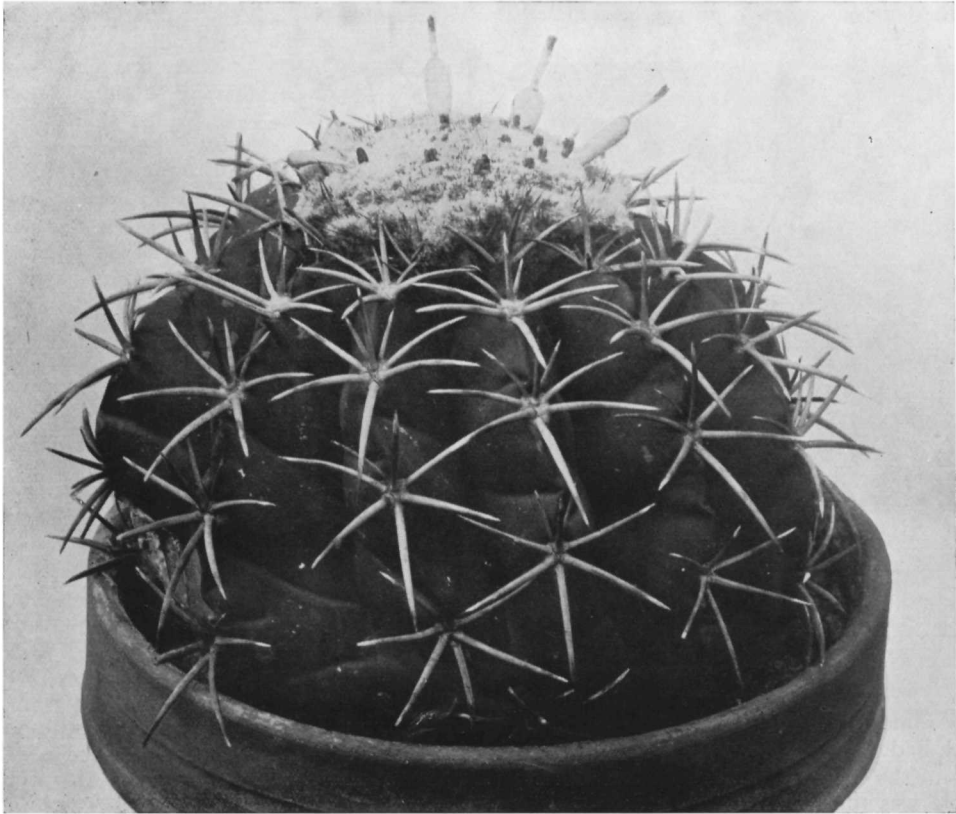


Fig. 1. *Melocactus depressus*.

seen at Kew and in other collections on the Continent and in this country, but they never seem to thrive or last long under the conditions met with in "captivity," so to speak.

There are, as most collectors know, several varieties of this interesting and rather unique plant, some being quite large, growing to a height of two feet or more, with a woolly head on the top nearly a foot in height, such as the "Turk's Cap" cactus, as it is popularly known.

The particular plant of which I write is one of the smallest, and although descrip-

America, and about sixty miles north of Pernambuco.

I rather thought from the look of the country that some cacti might be found, and from the scanty information afforded by the natives I decided to make a little excursion some miles inland in the hope of finding something of interest; and accordingly set out with a day's ration in the company of an old Englishman who had gone native, and a couple of boys.

A tramp across a rather arid stretch of country, mostly desert, with here and there

delightful little oases where tropical trees and other forms of vegetation luxuriated, ended in a spot where amongst other forms of plant life was a species of wild india-rubber tree which not only afforded a most welcome shade but bore a very pleasant edible fruit about the size of a golf ball.

Passing on over large stretches of sand, the sharp eyes of the Indian boys soon spotted some of the Melocacti, and sharp eyes are needed, as, at this season, the plants

no doubt they obtained condensed moisture from the heavy night dews, augmented by an occasional shower at this season.

I found some fully developed plants of the Melocactus, which is known locally as "Cabeza de Fradi" or Priest's Head, owing to the fancied resemblance to the shaven head of a friar, and the illustration in Fig. 1 shows this well, with some seed pods pushing up. I also found others, as seen in Fig. 2, which I thought at the time was another

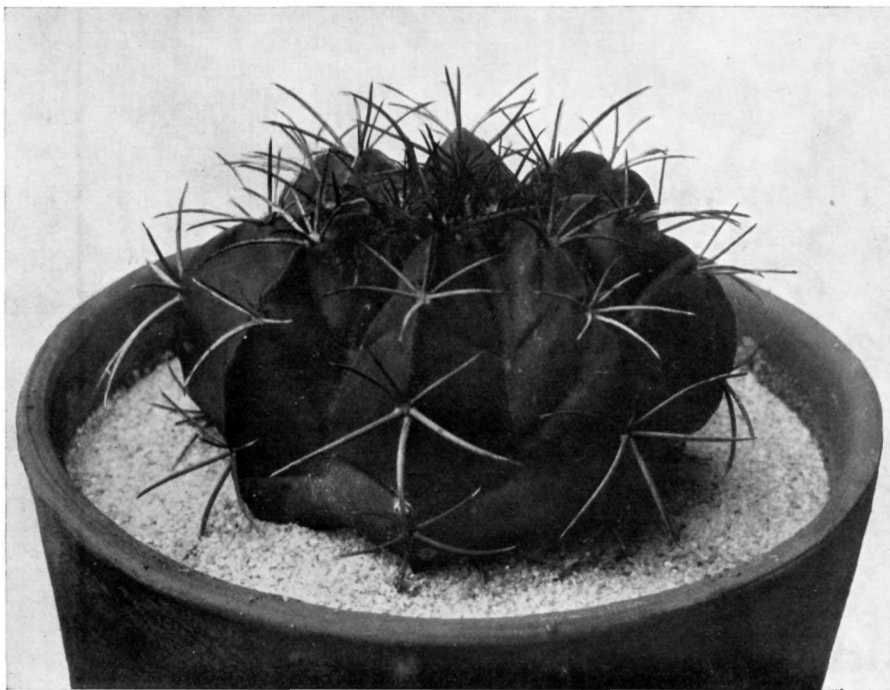


Fig. 2. *Melocactus depressus*, young plant.

were almost entirely buried in the sand which had drifted up (quite stiff breezes blow in from the sea at times), so that all that was visible was the woolly head, much the same colour as the sand around, and woe betide the unwary naked foot that trod on this, as the spines are sharp and strong.

Here and there I found plants of Melocactus, but they were not very abundant, never more than one or two together, and usually growing under the partial shade of shrubs.

The soil was, as mentioned, a fine sand strongly impregnated with sea salt carried by the prevailing wind (as the sea was only a few miles away as the crow flies), and the roots ran close to the surface to a distance of six or seven feet from the base of the plant amongst small pebbles, from which

species, but I discovered later that these were immature plants of the same species which had not yet developed the cap that typifies the Melocactus.

All sorts and sizes were growing round, from the fully developed plant with a good cap three inches across, to little babies no bigger than a shilling, but even these had roots extending for a very long way from the plant, pushing out, no doubt, even in their infancy, in search of the vital moisture. I brought to England in all about sixty plants, from which I cut off the long roots and, on the voyage home, struck them in moist sand, so that on arrival most of them were rooting.

The plant is rather flattened out from above, as its name implies, and has about twelve to fourteen ridges which are divided into

imperfect tubercles each carrying a tuft of spines, stellate in appearance, and about seven in number, with a central smaller one. The younger plants do not show these tubercles and have much the appearance of a small echinocactus.

The cap or head of the mature plant is most interesting, consisting of wool studded with minute spines, and from this the little red flowers spring up, followed by the coral seed pods, in much the same way as some of the mammillarias.

On reaching home I potted the plants up in the usual porous cactus compound, consisting of loam, brick rubble and some coarse sand, and most of them rooted and began to grow. Specimens were sent to The Royal Gardens, Kew, and to Messrs. Cannell of Swanley, who at that time specialised in cacti, and others to some private collectors, but in no case did they thrive for very long and soon became sickly.

The late Mr. W. Watson, who was at this time the Curator of Kew, pointed out that these plants are always found in their native state near the sea and required some salt in the compost used, and when I later came to Weymouth I tried this but was not very successful.

So far as my own personal experience goes, the Melocactus is always found in close proximity to the sea, and I have seen them growing and thriving in the West Indies, particularly in the Botanical Gardens in Jamaica.

What is lacking in this country is, I think, the ultra-violet rays so essential to many forms of tropical plant life, and it would be interesting to try the effect of an artificial form of this light which was not, of course, available at the time in question.

When I returned from Brazil I was living at Kew, and a good many of my plants succumbed there before I came to Weymouth, and it is quite possible they would have done much better under the sunny and fog-free conditions prevailing in the latter town.

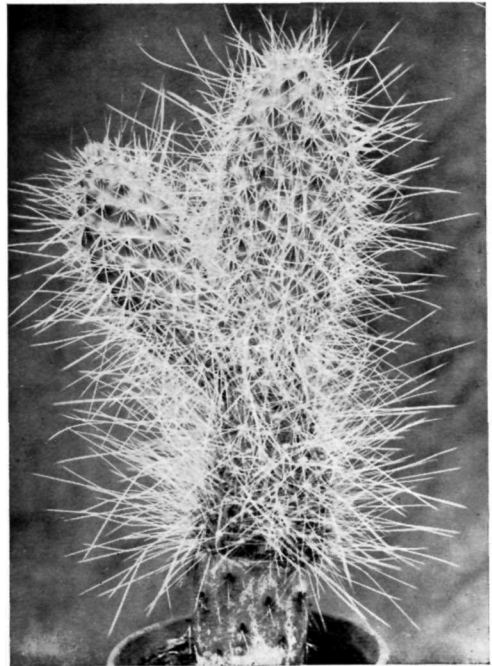
During my rambles in Natal I found one other species of cactus of the tall-growing type, and from these I took several cuttings a foot or so in length, as I could not find any single plants small enough to dig up, the majority being about six or seven feet in height and branching about half up the stem. This plant rooted and ultimately flowered, and proved to be a species of *Pilocereus*, very probably *P. Palmeri*, but it was unknown at Kew at the time.

These notes will, I am afraid, prove of

little interest to some of my readers, but they are a break-away from the articles describing culture and botanical features, and may possibly bring back, to those who have travelled some of the little-known paths, a breath of the wide open spaces.

Opuntia Ursina

The photograph, taken by Miss Worth of a grafted plant in her collection, shows the true *Opuntia ursina* Weber; this species is



Opuntia ursina.

not common in collections, *O. leucotricha* often being substituted for it. Beyond the fact that both have long bristles, the two plants are quite distinct, for the fruits of *leucotricha* are juicy and edible, whilst those of *ursina* are dry. In their Monograph, Britton and Rose consider *Opuntia ursina* to be a slender form of *O. erinacea*, from the Mojave Desert. In the trade it is known as the Grizzly Bear Cactus; Alverson has given the following description: "This curious plant is covered with tawny white hairs or flexuous spines, some of which are from 3 to 6 inches long, and I have some extra fine specimens with the spines or hairs 9 and 12 inches long."

Haworthia Attenuata

Its Varieties and its Near Relatives

By R. S. Farden

SEVERAL Haworthias show slight variations in their adornments, but *H. attenuata* gives quite a few marked variations. In some, various leaves on the same plant show marked differences of the disposition of the tubercles and, therefore, in examining them, it is necessary to take an average before describing them. Dr. Karl von Poellnitz has recently issued a leaflet upon these varieties in which he says:—"I find this species is an extremely variable species." Baker, in *Flora Capensis* Vol. vi, 1896, gives *H. attenuata* and the variety *clariperla* only. Last year Von Poellnitz gave another variety, *H. attenuata* var. *Britteniana*. A. Berger (1910) added another variety *argyrostigma* which Baker had given as a variety of *H. subfasciata*.

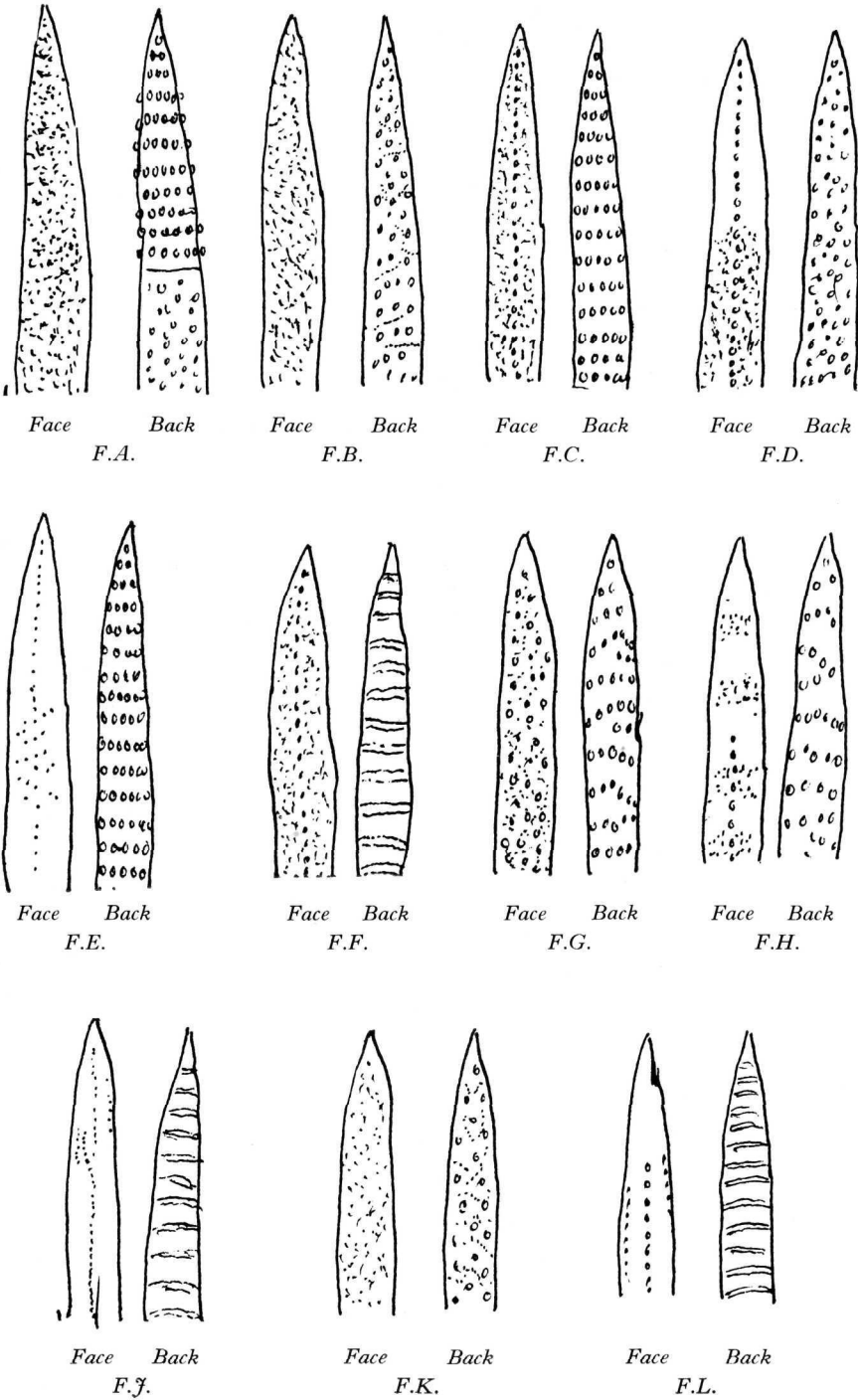
I recognise eleven distinct varieties and have illustrated them, placing them in their order, beginning with the leaf-face with the most tubercles, down to nearly none. It is more important to note the variations of the face rather than those of the back. *H. radula* and *H. rugosa* are closely allied to *H. attenuata*; in *radula* the face is entirely covered with very fine tubercles evenly distributed and the back is also similarly covered with the same sized tubercles.

The face of *H. rugosa* is also entirely covered with the same sized tubercles, the back is similarly covered, but the tubercles are a little larger than those on the face. Some collectors who do not examine their Haworthias very closely find a difficulty in separating *H. fasciata* from the *attenuatas*, because the backs of the leaves are very similar to some of the varieties of *H. attenuata*, but it is easy to know one from the other; the face of the *attenuatas* has always some tubercles, whereas the face of the *fasciata*s never has any, and is not even rough but smooth. The leaves of *H. attenuata* are $2\frac{1}{2}$ to 3 inches long those of *H. fasciata* are $1\frac{1}{2}$ to 2 inches long, and in *attenuata* the leaves tend to curve outwards. *Fasciata* leaves always stand out at an angle of 45 degrees. There are now several new varieties of *fasciata*, viz. *H. fasciata typica*, var. *major*, var. *caespitosa* v.P., var. *sparsa* v.P., *ovato-lanceolata* v.P., var. *vanstaadensis* v.P. and var. *variabilis* v.P.

DESCRIPTION OF THE ILLUSTRATION

- F.A. This is variety *clariperla*; face completely covered with small white tubercles and those of the back showing on the face down the margin. Back varied, some tubercles are in regular rows, almost confluent; on other leaves they are quite irregularly disposed and not at all confluent.
- F.B. This is *Britteniana*. Face with very fine tubercles, white, evenly disposed. Back with larger tubercles also evenly disposed and with very, very fine ones amongst them.
- F.C. Face with fine white tubercles evenly disposed and with a defined line of them down the centre. Back with larger tubercles, in even rows, not confluent.
- F.D. Face in this variety also has a defined row down the centre and the lower half has fine white tubercles; the upper half is devoid of tubercles. Back has larger tubercles without any suggestion of rows.
- F.E. This variety is *typica*. Face with a central row of tubercles and only a few others spread about in the lower half. Back with larger tubercles in fairly defined rows but not confluent.
- F.F. Face has a defined row of tubercles down the centre and is covered with fine ones from apex to base. Back has the most defined bands of any variety.
- F.G. Face with white tubercles evenly distributed, medium sized and with very small ones mixed with them. Back with medium sized tubercles in somewhat irregular rows.
- F.H. Face with a defined row of tubercles in the centre of the lower half only and groups of very fine ones about the surface. Back with larger, unevenly distributed tubercles.
- F.J. Variety *argyrostigma*; this is of rather different growth and with wider leaf base; it has been recently made a variety of *attenuata* by Von Poellnitz; it was formerly regarded by Baker as a

Illustration of the Eleven Varieties of
Haworthia Attenuata



variety of *subfasciata*. *Face* with a row of colourless tubercles down the centre and a few short rows elsewhere.

F.K. *Face* pretty well covered with very fine concolorous tubercles. *Back* covered with middle-sized white tubercles and also with very fine ones, all irregularly disposed without any semblance of rows.

F.L. *Face* has rows of colourless, moderate sized tubercles down the lower half, and with whitish ones on the margin. *Back* with bands of white tubercles, very thin and close together.

Adromischus Poellnitzianus Werderm.

By Karl von Poellnitz

Oberlödla

THIS species is published by Prof. Werdermann in Fedde, *Repert.* xxxix (1936) 270.—Stem up to 5 cm. long, a little branched later, beset with very numerous reddish aerial roots up to 1 cm. long. Leaves alternate, nearly rosulate, covered with very minute hyaline hairs, pale green, somewhat broadened from the base to the base of the end-surface, terete from the leaf-base to about the middle and gradually flattened from this point to the tip, 5–6 but up to 10 cm. long, end-surface broadened, spade-like or arrow-shaped, rounded or rounded-obtuse and frequently undulate at the tip, 12–22 mm. long and broad. Scape up to about 40 cm. long, reddish green, pruinose, simple or forked below the inflorescence, with very few small bracts towards its base, smooth, but with minute hairs in its lowest part. Inflorescence many-flowered, in cultivated plants with about forty flowers. Flowers alternate, smooth, single or 2–3 together, nearly sessile, erect. Calyx green, pruinose, $3\frac{1}{2}$ –4 mm. long, its lobes 2 mm. long, lanceolate, reddish at their tips. Corolla tube about 12 mm. long, cylindrical, inconspicuously narrowed and distinctly keeled towards the tip, greenish, pruinose, lobes deltoid or a little ovate-deltoid, acuminate, acute, 3–4 mm. long, horizontal at first, recurved later, white, red on both sides at the tips. Filaments, carpels and styles included. Nectaries hardly square, a little narrowed towards the tip, indistinctly

longer than broad, about 1 mm. long, hyaline, emarginate at the tip.—Cape colony: Near East London, A. P. F. Kluth; type plants cultivated in the Bot. Garden, Dahlem. The photograph shows Stellenbosch 112, from the same locality. This new species is allied to *Adromischus cristatus* (Haw.) Lem., *A. Zeyheri* (Harv.) v.P. comb. nov. and *A. Schönlandii* (Phillips) v.P. comb. nov.



Adromischus Poellnitzianus.

These four species, which have minute, hyaline hairs on the leaves, may be distinguished by the following key:—

1. Leaves terete only in the petiole-like part, i.e. towards the base : 2.
- Leaves terete from the base to the middle or nearly to the tip : 3.
2. Flowers smooth : *A. cristatus*.
- Flowers with hairs outside : *A. Zeyheri*.
3. End-surface distinctly broadened. Leaves terete from the base nearly to the middle, up to 10 cm. long : *A. Poellnitzianus*.
- End-surface not or scarcely broadened. Leaves terete from the base nearly to tip : *A. Schönlandii*.

A. Zeyheri is so far known only from the type locality: Kenko river, east of the Buffeljags river (Swellendam or Riversdale Div.), Zeyher 2571! The collector and the locality of *A. Schönlandii* are unknown.—Many localities of *A. cristatus* are known: near Port Elizabeth, near Grahamstown, Somerset East and Graaff Reinet.

Descriptions of *Conophytum* Species (Continued)

By Mrs. Louisa Bolus

EXPLANATION OF COLOURED PLATE

PLATE 3.—A. *Conophytum vlakmy-nense* L.Bol. Mesemb.III, 96 (1937).—

This plant, the type of the species, was received in flower from Mr. P. van Heerde in February 1937, when the drawing was made. It is, therefore, among the earlier of the *Conophyta* to flower, if we reckon the species flowering in January among the earliest. A few species flower in December, and, like this one, show signs of the summer heat in the ruddiness of some of the bodies. The nearest affinities seem to be with *C. albescens* N.E.Br. and *C. obtusum* N.E.Br. These two are themselves apparently very closely allied species, and it is quite likely the latter may not be distinct from *C. albescens*. We have not yet had an opportunity of examining living material of either, and know them only from the information published in the descriptions and illustrations. *C. vlakmy-nense* is quite smooth and is devoid of spots. It is named after its locality, Vlakmyn in the Richtersveld.

Fig. 1, body; 2, do., opened, with part of fl.; 3, calyx, nat. size; 4, corolla-segments $\times 2$; 5, bracts, with portion of peduncle below the transverse line, nat. size; 6, long. section through portion of fl. $\times 3$.

B. *Conophytum citrinum* L.Bol., Mesemb. III, 26 (1936).—This is another species in the section *Biloba* to be recorded from the Richtersveld, an area in Namaqualand in which the yellow-flowered forms of the section are well represented. The drawing is of the type-plant, collected by Mr. R. Smithers at Rubus in September 1935, which flowered at Kirstenbosch (N.B.G. 2882/35) in May 1936. The flowers remain open a remarkably long time, and the tube of the calyx and corolla lengthened considerably between the period of the first expansion of the flower and its withering. The surface of the body is velvety to the touch on account of the minute papillae or microscopic hairs which cover it. The specific name refers to the citron or lemon-yellow corolla.

Fig. 1, body, opened, with part of fl.; 2, calyx; 3, corolla-segments, nat. size. See also Plate 2a, B2 (page 50).

C. *Conophytum altum* L.Bol., Mesemb. I, 21, 130 (1927), var. *plenum* L.Bol., *ibid.*, III, 86 (1937).—The type of this species was collected by Mr. N. S. Pillans in October 1936, near Brakfontein, and the type of the variety in March 1937, by Mr. P. van Heerde, near Port Nolloth—localities sufficiently wide apart to make the geographical distribution of the species interesting, if the Port Nolloth plant has been correctly placed as a variety. At present it seems better to regard it as such until there is more leisure for the detailed observations necessary for deciding the exact relationships of the very closely allied species to be found in this section. The only floral difference is the plenitude of the corolla-segments as compared with the rather meagre number found in the type of *C. altum*, as is shown in the drawing (Mesemb. I, 20).

Fig. 1, body, with fl.; 2, calyx, nat. size; 3, corolla-segments enlarged; 4, long. section through portion of fl. $\times 4$.

D. *Conophytum parvulum* L.Bol., Mesemb. III, 30 (1936).—This was collected by Mr. R. Smithers in the Richtersveld (the precise locality not recorded), in September 1935, and flowered at Kirstenbosch (N.B.G. 2784/35), in May 1936, when the drawing was made. As it appeared then the name *parvulum* (very small) was applicable enough; but the plant has since changed so much in cultivation that a second drawing will be required to adequately represent the species. The plant is still alive but has not flowered again.

Fig. 1, body; 2, do., opened, with part of the fl.; 3, calyx, nat. size; 4, corolla-segments $\times 3$. See also Plate 2a, D (p. 50).

E. *Conophytum modestum* L.Bol., Mesemb. III, 29 (1936).—The drawing represents a portion of the type-plant, collected in July 1934, by Dr. J. D. Luckhoff, at Sendling's Drift, in Namaqualand, which flowered in his garden a month later. No further observations were made on the plant before it died the following year, nor is there any other collection recorded, although various keen collectors have visited this

locality. The species is remarkable in the section for the very short corolla-tube and stigmas and the absence of a style.

Fig. 1, body, opened, with fl. ; 2, calyx, nat. size ; 3, receptacle, disk and gynaeceum, with portion of calyx, corolla and androeceum, enlarged.

F. *Conophytum cordatum* Schick. et Tisch., Zeitschr. f. Sukk. III, 152 (1927), var. **macrostigma** L.Bol., Mesemb. III, 89 (1937).—Our variety was collected in the Richtersveld, at Tussen-in-Mountains, by Mr. P. van Heerde and flowered in March 1937, when the drawing was made. The species is unknown to us except from descriptions and figures, and according to these the variety differs chiefly in the longer corolla-segments and stigmas.

Fig. 1, body, with young fl. ; 2, do., opened, with part of fl. ; 3, calyx ; 4, corolla-segments, nat. size ; 5, long. section through portion of fl. $\times 3$.

G. *Conophytum bilobum* (Marl.) N.E.Br., *Gard. Chron.*, vol. 72, 83 (1922).—According to the description in *The Gardener's Chronicle* this species varies considerably and appears to contain our present plant within its wide limits. The exact locality of the type is unknown ; but a collection of Dr. Pearson's (Percy Sladen Memorial Expedition, No. 6203), made a few years later, from plains between Stinkfontain and Chubiessis has been identified with this species. Mr. P. van Heerde's collection represented here was made along the road between Anniesfontain and Helskloof, and flowered in March 1937, when the drawing was made.

Fig. 1, body ; 2, do., opened, with part of fl. ; 3, calyx, nat. size ; 4, corolla-segments ; 5, bracts $\times 2$; 6, long. section through portion of fl. $\times 3$.

H. *Conophytum Meyeræ* Schwant., *Gartenwelt* 33, 25 (1929).—The drawing represents a portion of the type-material collected by Mr. G. Meyer, in the Steinkopf area, and flowered in the Stellenbosch University Gardens in May 1931. The proportionately long convex lobes of the body, tapering towards the apex, readily distinguish this species from the many other yellow-flowered species in this section.

Fig. 1, body, with fl., side view ; 2, half of body, front view ; 3, part of fl. ; 4, calyx ; 5, corolla-segments, nat. size ; 6, long. section through portion of fl. $\times 3$.

Recording Cacti

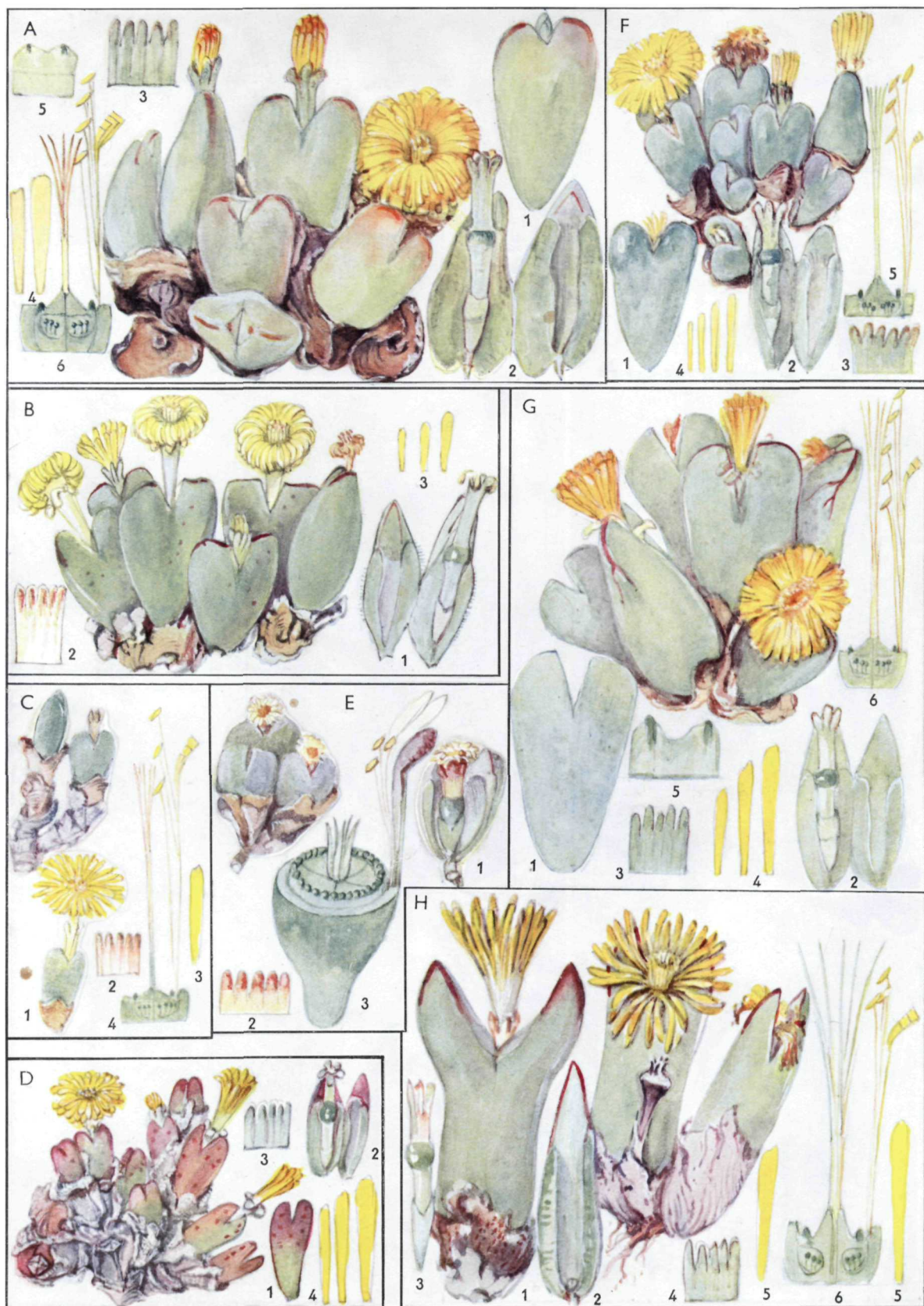
Mr. A. Cumming writes :—Many members and readers of the *Journal* will have noticed an article in the March issue of this year, contributed by the Rev. F. C. Champion, on the subject of recording cacti and succulents. I have found the method of the card-index system very much better than the use of a book. My first experiences of making records of the plants was by using a book, and one of the first points I had to consider was how many pages I should devote to each particular plant, as so many notes can be gathered together from time to time worthy of entry.

Then again, once the space has been filled up I do not consider it advisable to continue the notes in another section of the book, or even to continue them in another book. To try and stick further pages in would eventually make it untidy, and a book's covers can hardly be expected to stretch to allow of additional pages. Certainly a loose-leaf book would overcome this untidiness, but this, again, has its limitations. Actually a loose-leaf book is not unlike a card-index, but the great advantage of the latter is that it so easily allows extension by additional insertions.

Cards containing notes appertaining to one particular plant can easily be clipped together if desired. Alphabetically-marked sector cards set "the house in order" so to speak. To elaborate this method, I use white cards for cacti and blue for succulents ; this is not essential if they are kept in alphabetical order, but it affords a quick way of determining a card.

In a similar manner, I have adopted a method of labelling the plants with xylonite labels in white and green ; with a zinc stem, these can be obtained very reasonably. For the cacti I use white labels, and for the succulents green ones. Often one is confronted by inquisitive visitors of the uninitiated section who do not know a cactus from any other succulent, especially when they are grown together in the same house. Here is a way that the plants can be differentiated at a glance.

Members are reminded that there is a competition for Cacti and Succulents organised in connection with the Royal Horticultural Society's Fortnightly Show on September 13th, 1938. Particulars may be obtained from the Secretary, Royal Horticultural Society, Vincent Square, London, S.W.1.



For Beginners Only

TO many people, any succulent plant is a cactus, and they are puzzled when they are told that such and such a plant is not a cactus even though it is very succulent. The succulent habit, by which a plant stores water in its tissues, is an adaptation to conditions of extreme drought during some periods of its life, and may be assumed by any plant living under such conditions; it is not a characteristic of any one plant family. The fact that practically all members of the cactus family (Cactaceae) are succulent has led to an inverse and quite erroneous reasoning that all succulent plants are cacti; it is as though one said that a pear is a fruit, therefore all fruit are pears.

Part of the difficulty that the non-botanist finds in distinguishing between cacti and other succulent plants is due to what is known as "parallel development"; thus, the same set of causes acting on similar material may produce similar results; the desert conditions of America have produced columnar cacti and the desert conditions of South Africa have produced columnar euphorbias; there is a marked superficial resemblance between the plants as regards their general habit, but as soon as they flower, the difference is obvious; the columnar cactus will produce large, many-petalled, funnel-shaped blossoms, with countless stamens in the throat, whilst the columnar euphorbias will have quite small, greenish organs, each of which actually represents an inflorescence and consists of several very reduced flowers. The nature of the plant has not been changed, only its outward appearance.

But in Euphorbias the spines are of quite different origin; botanically they should be called thorns, for they arise from deeper-seated layers of tissue and not from the superficial layers only. A thorn, in fact, is a metamorphosis of some other organ; if euphorbia thorns are examined when quite young (e.g. *E. submammillaris*) it can be seen that they are tiny shoots on which the leaves hardly develop; instead of growing on in the normal way, they become woody and stiff, but the tips are rarely so sharp as those of cactus spines. In other euphorbias, *E. Echinus* for example, the thorns are converted stipules; at the base of the stalk of many leaves are found a pair of tiny leaves (these can be seen very well in the rose) and, if one imagines these reduced till only the midribs remain, then there would be a pair of spines at the base of the leaf-stalk,

or beside the scar if the leaf has dropped. In yet other cases, such as *Euphorbia meloformis*, the thorns are the remains of the flower stalks which become woody after the flowering period.

It should not therefore be difficult to tell a cactus from a euphorbia, even when they are not in flower.

The cause of this production of spines is another matter; it is a common occurrence amongst plants which grow in desert regions, whether they are succulent or adopt some other device to protect themselves during drought. One thing is certain; the plant has no mechanism by which it can consciously think out that spines would prove excellent weapons of defence against browsing animals; the fact that spines *do* act as a deterrent in this way is fortuitous though the characteristic may have given the plants possessing it a greater chance of survival during the slow processes of evolution. It is generally considered that spines are, as it were, by-products; owing to the unusually small amount of water they obtain at certain periods of the year the plants are unable to get rid of excess matter by evaporation through the pores so that it becomes deposited either within the tissues of the plants or as excrescences.

A cactus, then, is a succulent plant, nearly always without leaves, but with a swollen succulent stem, which is green, as it has to perform the functions of the absent leaves; in form the stem may be flattened or round, erect or pendulous, columnar or even spherical; but always present is that characteristic feature, the areole from which the spines arise.

Cacti, therefore, are stem-succulents. There are many other plants which store water in their stems and whose leaves are absent or greatly reduced; for instance, the euphorbias that have already been mentioned, senecios like the Candle Plant which produces leaves at certain periods of the year only, and the stapelias which have rounded or angular stems with tiny leaves up the angles.

But there are also a large number of plants which store water in the leaves so that these become very much thickened. Aloes and haworthias are familiar to many people; their thickened leaves are generally crowded together at the base of the stem so as to form a rosette; by this arrangement the over-

lapping leaves afford some protection to each other.

The same arrangement is found in sempervivums and aeoniums, but it is not usual to class sempervivums as "succulent plants"; botanically, of course, they are succulent, but, for horticultural purposes, it is usual to regard as "succulent plants" only those plants which need protection from frost in this country; so we get the curious anomaly that sempervivums are classed as alpine though aeoniums, which are very nearly related but come from the Canary Islands, are usually included in collections of succulent plants.

Other leaf-succulents are echeverias and the large group of the Mesembryanthema; in the shrubby types, which grow and flower so well in the summer months along the south coast, the stems are woody and the leaves much swollen; in other species such as the faucarias, the leaves are arranged in a rosette, but in lithops and conophytum, the Pebble Plants, the whole plant consists of only one pair of leaves and these are fused so closely together to form a little top-shaped body that it is only possible to see that they originated from two leaves by the slit across the top through which the flower pushes. Spines are unusual in the Mesembryanthema, though there is one small group (Trichodiadema) that has a tuft of stiff hairs at the tip of each cylindrical leaf which makes it look rather like a mammillaria with very elongated tubercles; but the presence of the woody stem supporting the leaves shows that the plant is a leaf and not a stem-succulent and so cannot be a cactus.

People who have been collecting succulents for some years often specialise in one or two types which they prefer or which they find grow best in their conditions. But the beginner is more likely to be attracted by one or two curious looking little plants, and will acquire perhaps a dozen, often—but erroneously—described as a mixed collection of *cacti*. If these are wanted merely for decorative purposes, what they are and what their curious form means will matter little to their owner. But it is surely much more interesting to realise why plants differ from ordinary plants and in what way.

The little plants that are offered by the florist may be named (and the names may even be correct) or they may be nameless; in the latter case, they may not be at all easy the name, even for an expert. The novice is often disappointed when he takes or describes his plants to someone who is more familiar

with them, to find that he cannot immediately be given names for them. The chief reason for this is that many of these little plants are immature; they are either offsets from larger plants, which may or may not resemble their parents, or they are young seedlings; and often the seed has been hybridised so that they are not even true species. Many a beginner who wants to know more about his plants would save himself disappointment if he bought his first plants from a dealer who can be trusted to supply them properly named.

On the whole, succulent plants are very easy to grow, but, here again, the beginner may make difficulties for himself by acquiring a number of quite unrelated types; now it is much easier to grow a houseful of geraniums than to try and cultivate geraniums, cinerarias, roses, carnations, etc., all in one greenhouse; but, of course, it is much more interesting to have different kinds, but if they do not all do equally well under the treatment given to them, their owner should realise that they come from different parts of the world where, though the conditions may be similar, the seasons are different, and not expect them all to behave exactly alike. For the owner of a dozen succulent plants, the death of one is a tragedy; when his collection is numbered in hundreds, he will be more philosophical.

The cultivation of most succulent plants offers no difficulty at all, provided it is remembered that the cause of succulence in plants is a dry period at some time during the year. They must not, therefore, be watered daily all through the year like ordinary plants. The converse is equally true; they must not be kept dry all the time either. Succulent plants are very tenacious of life and will exist under most adverse circumstances, but to make them grow well they must be treated with consideration. Think of the conditions in their native haunts. In extreme cases there may be no rain for months on end, the only chance the plant has of obtaining water is from dew at night if the temperature falls sharply after a hot day. But when the rain does come, it is often in the form of sudden heavy storms. So give the plants a thorough rest for a month or two, but, when signs of growth appear, give a thorough watering; if the number of plants permit it is better to soak the pots from below and give no more water till the soil is drying out. Frequent dribbles from above tend to harden the surface soil and to keep the collar of the plant damp while the roots are still dry—and then the trouble begins.

With the plants that a beginner is most

likely to acquire, it is fairly safe to make the winter months the resting period; when temperatures are low and there is little sun, the plants feel no urge to grow, but when the better weather comes in March or April then watering may begin, slowly at first, once a day in full summer, gradually reducing the amount towards autumn and discontinuing it altogether from October onwards.

Many plants which come from other continents will change their period of growth so as to conform to our seasons, growing in our summer and resting during our dull, damp winter weather. This is a great advantage as there is always a danger that the plants may rot off if they get too much water during sunless periods, and they can withstand cold better when the roots are fairly dry. This applies to most cacti; whether they come from South America or from North, they can be treated in much the same way, and it is only a few of the types which come from the moist forests of Central America that prefer to rest in the summer after flowering, but these are not nearly so sensitive to excess moisture as the true desert types.

Unfortunately many of the plants that come from South Africa will not change their season to ours, and unless they are winter-growers in their native country they will want to grow during our winter, which is summer-time in South Africa. Such plants will have to be humoured. They form one of the interesting problems for the grower of succulents and only he who can maintain a nice balance between enough water but not too much can hope to be really successful with this type—but they are well worth attempting.

It has been said that the worst pest in the greenhouse is the watering can. Unfortunately the noble art of watering correctly appears to be a gift—it is very difficult to learn unless one has the “feeling” for it. As a safeguard, until the beginner discovers if he is among the elect and safe to be let loose with the watering can, it is as well to make the soil even more porous than is actually necessary, by the addition of coarse (not fine) sand, broken brick, granite chips, etc. But anyone who can water safely and wisely may choose his own mixtures, experiment as he will to get the results he wants—and then he has ceased to be a beginner. But let him not forget his early struggles and be willing to lend a hand to initiate others into the delights of a collection of succulent plants really well grown.

Officers of the Cactus and Succulent Society of Great Britain, 1938

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Meetings

The following Meetings have been arranged :—

June 8th. Miss Mackenzie will give a talk on “Phyllocacti, Epiphyllums and Rhipsalis.”

Please note that this Meeting is being held on a *Wednesday*, owing to the Whitsun Holidays.

June 21st and 22nd. Cactus Exhibition.

Entries should be sent to the Hon. Secretary by June 16th, and earlier if possible. Extra copies of the Schedule can be had on application.

July 19th. This will be a “Members’ Evening.”

Members are asked to bring forward any points they wish discussed, any questions they want answered, or to show any interesting plants, etc.

All Meetings are held at the Royal Horticultural Society’s New Hall, Greycoat Street, Westminster, at 6 p.m.

Haworthia Fasciata (Willd.) Haw.

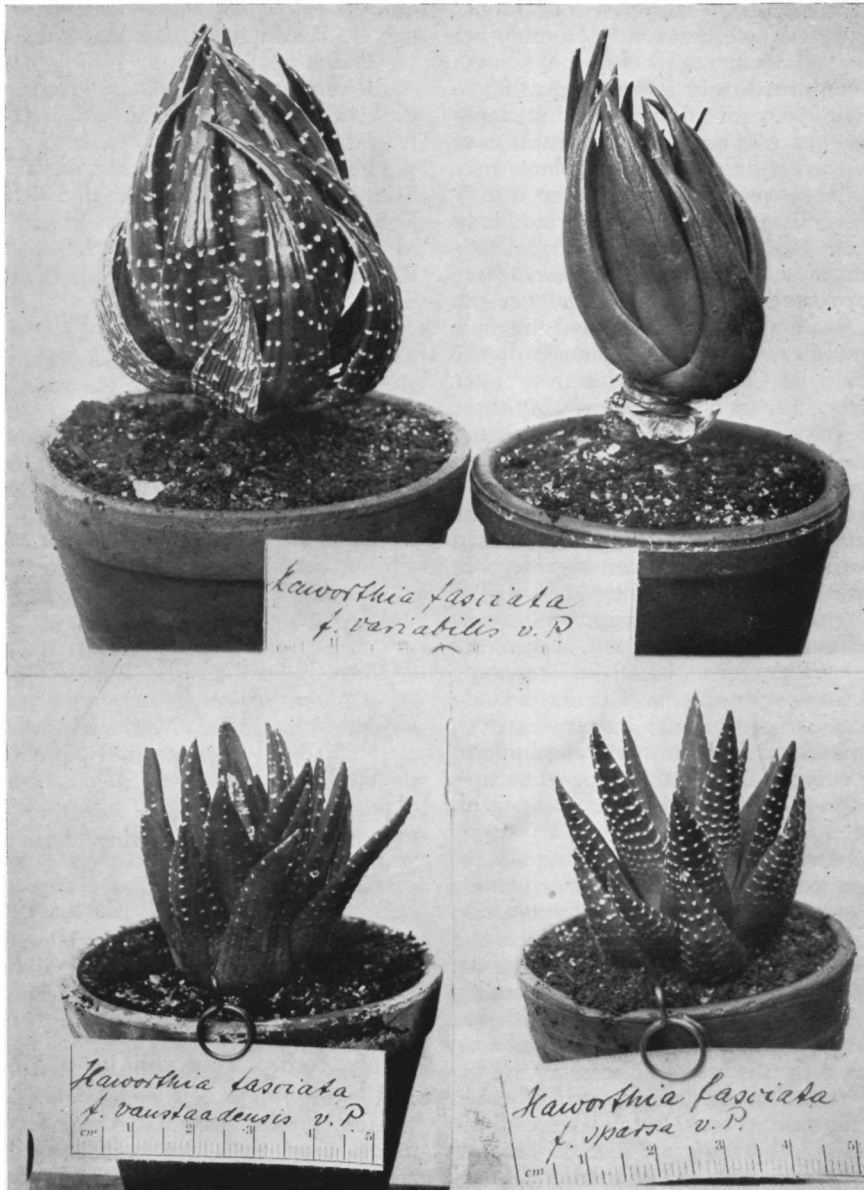
By Dr. Karl von Poellnitz

Oberlödla.

(Photos: Archiv Bot. Museum, Dahlem).

1. In the typical *Haworthia fasciata* (Willd.) Haw. the leaves are 3-5 cm. long, 1-1½ cm. broad towards the base; their face is smooth,

2. var. *caespitosa* Berger is said to be a hybrid between *H. fasciata* and *H. attenuata* Haw., but in October 1937 I received a plant



Three varieties of *Haworthia fasciata*.

their back bears large white tubercles nearly completely running together to about 15-20 cross-rows. Many localities are known.

of this variety collected by Mrs. Helm near Great Brak River. The leaves of this variety are 6-7 cm. long, about 1½ cm. broad towards

the base; face with very small tubercles, back with tubercles arranged in more remote cross-rows and less confluent towards the leaf tip. This variety is more often found in our succulent collections than the true species.

3. forma *subconfluens* v.P.—Leaves 3–5½ cm. long, about 1½ cm. broad towards the base; face smooth or with very few, very small whitish tubercles; tubercles of the back white, solitary (especially towards the leaf-base) or running together to mostly short cross-rows, which are sometimes only indistinct. This form runs into the type. The type plants of this form were collected by Mrs. J. King near Humansdorp.

4. forma *major* (Salm) v.P.—This form is near f. *subconfluens*, but the leaves are larger, 5–8 cm. long, about 2 cm. broad, their face is always completely smooth, their back is similar to that of f. *subconfluens*. Salm received the type from van Marum. This form grows near Humansdorp and near Port Elizabeth; it runs into the type.

5. forma *ovato-lanceolata* v.P. was collected by Mr. Hobson near Gamtoos River, Uitenhage Distr. Leaves ovate-lanceolate, very spreading, a little shining, dark green, 4–5 cm. long, about 2 cm. broad; face smooth; tubercles on the back nearly medium-sized, mostly roundish, solitary, arranged in indistinct longitudinal lines, but not or scarcely in indistinct cross-lines.

6. forma *sparsa* v.P.—The photograph shows the type plant collected by Mr. Long on the Witte Klip Mountains. Leaves 3–5 cm. long, 1–1½ cm. broad towards the base; face smooth; tubercles on the back mostly completely solitary, rather small, arranged in somewhat prominent longitudinal lines. This form was also collected by Mr. Armstrong near Uitenhage.

7. forma *vanstaadensis* v.P.—The photograph shows the type plant collected by Mrs. Archibald at Van Staadens Pass, Humansdorp Road, near Port Elizabeth. Leaves 4–5 cm. long, about 1–1½ cm. broad towards the base; face smooth; tubercles on the back mostly completely solitary, not numerous, sub-prominent, whitish or whitish-green, arranged in longitudinal lines and only very seldom in very indistinct cross-lines.

8. forma *variabilis* v.P., the most interesting form! The photograph shows the type plants collected by Mr. F. J. Cook in the Uitenhage Distr., Elands River Road. Mr. Long, of Port Elizabeth, who agrees entirely with all my remarks concerning all these forms of *H. fasciata*, wrote me :—"Two very

remarkably distinct forms in a group of typical *fasciata*." The leaves of f. *variabilis* are about 5 cm. long, 1–1½ cm. broad towards the base, dark green, rather shining, sometimes somewhat curved laterally like a sickle; face smooth; back of one of the plants smooth; tubercles of the leaf-back of the other plant medium-sized, solitary, irregularly distributed, only slightly prominent, white, arranged in longitudinal lines but not or scarcely in indistinct cross-lines. Now, we have in the section *Margaritiferae* a plant without tubercles, with completely smooth leaves!

Up to this moment Mr. Long and I do not know whether these forms, which are indeed puzzling and very interesting, are constant. The scientific descriptions of these very curious forms are published in Fedde, *Repert.* xliii (1938) 94–97.

Index

The Index to Volumes V and VI is issued with this number which completes Vol. VI.

No special arrangements are being made for binding these two volumes, as it appears that members prefer to make their own arrangements.

Back Numbers

Members who have joined the Society recently may like to have back numbers of the *Cactus Journal*. Unfortunately the first volume is out of print, and the response to the enquiry as to whether there was sufficient demand for it to warrant reprinting was not great enough to warrant the expense that it would involve. But all the later volumes are available and can be supplied at 6/- per volume (1/6 per number) on application to the Hon. Secretary, Mrs. Vera Higgins, 28, Northampton Road, Croydon.

In future the Society itself will be responsible for the publication of the *Cactus Journal*. All communications, including those dealing with advertisements, should be addressed to the Hon. Editor, Mrs. Vera Higgins, 28, Northampton Road, Croydon.

The Journal is sent to all Full Members of the Cactus Society but is not obtainable otherwise, except by persons resident abroad, who can have it supplied for 6/- per annum on application to the Hon. Editor.

Flowering Cacti

By A. Boarder

AT the February Meeting, during a discussion on how to make Cacti flower, I stated that the sun had more to do with determining the amount of flower one would get than any special method of treatment. I did not then know how soon my words would be proved correct, as no one could foresee such a wonderfully sunny March as we have just enjoyed. What the excessive March sun has done to encourage flowers, many members beside myself have no doubt noticed. I do not remember ever having so many mammillarias in flower so early in the year.

There appears to be little doubt that, no matter how well a cactus may be grown and how much care may be taken with it, little or no flower can be expected unless the plant gets plenty of sunshine. There may be a few, such as *Epiphyllums*, which will flower without an excess of sunshine, but almost all the spiny cacti must have plenty of sun before they will flower.

It is imperative, then, to let the plants get all the sun possible, by seeing that a good position is chosen for the greenhouse and that the glass is kept clean, more especially in the spring, as if the glass gets shaded over slightly in the summer it will not do much harm.

Now what else can one do to be sure of getting plenty of flowers? First of all, I should like to explode the theory that cacti only flower when the pot is root bound. Many of my plants which have been potted on into fairly large pots, in relation to their size, have not only made good growth but they have flowered as well. I have previously stated that I have flowered mammillarias in a box among others, when they have had plenty of room. The matter of a long rest to give the plants a chance to flower does not seem to me to be necessary, as I have noticed several seedlings flower at one year old, which certainly have had no rest at all, but have been continually grown on. One mammillaria seedling was in bud before the end of the year in which the seed was sown. I certainly find that plants raised from seed flower more freely than imported plants, and I have no doubt that the better a plant is grown the more chance it has of flowering.

The following is a list of mammillarias which have been in flower in March this year :—

M. albicoma.
M. angularis.

M. angularis var. *rufispina.*
M. aurihamata.
M. bocasana.
M. „ var. *flavispina.*
M. bogotensis.
M. candida.
M. caput-medusae.
M. castaneoides.
M. Celsiana.
M. centricirrha.
M. „ var. *Hofferiana.*
M. „ var. *Krameri.*
M. „ var. *longispina.*
M. „ var. *Pazzanii.*
M. centrispina.
M. cephalophora.
M. collina.
M. compressa.
M. crucigera.
M. decipiens.
M. Donatii.
M. elegans.
M. elongata.
M. „ var. *anguina.*
M. „ var. *echinata.*
M. „ var. *rufescens.*
M. „ var. *rufocrocea.*
M. erythrosperma.
M. falcata.
M. Gasseriana.
M. gladiata.
M. glochidiata var. *crinita.*
M. gracilis.
M. „ var. *Monvillei.*
M. Haageana.
M. Hahniana.
M. Heeseana.
M. jalescana.
M. longicoma.
M. Mendeliana.
M. microhelia.
M. micromeris var. *Greggii.*
M. mutabilis.
M. Neumanniana.
M. Nunezii.
M. ocamponis.
M. Orcuttii.
M. Painteri.
M. pilispina.
M. pusilla.
M. „ var. *albida.*
M. „ var. *haitensis.*
M. „ var. *texensis.*
M. pyrocephala.
M. Runyonii.
M. Schafferi.

M. Schelhasei.
 M. Schiedeana.
 M. Schmollii.
 M. Seitziana.
 M. sinistromata.
 M. sp. (Unnamed.)
 M. spinosissima.
 M. „ var. brunea.
 M. stellaris.
 M. surculosa.
 M. Viereckii.
 M. „ var. brunea.
 M. Wildii.
 M. „ var. rosea.
 M. „ var. cristata.

On the thirty-first of March I counted 400 flowers on mammillarias.

Several other plants are budded for flower. The rhodanthe varieties are not yet flowering nor are any of the Coryphanthas. *M. bombycina* has been in flower continuously since early February; the *M. bogotensis* mentioned has a small carmine flower but a very handsome terra-cotta coloured berry. I notice that Borg in his recent book on "Cacti," states that the flower and fruit of *M. bogotensis* are as yet unknown. I have a nice crop of seedlings raised from my own plant, which I have mentioned as having flowered in previous numbers of the *Journal*.

Editorial

THIS number of the *Cactus Journal* completes the sixth volume; we are indebted to a number of contributors for their assistance and hope that they will continue to send articles and photographs, and also that their ranks will be swelled by new contributors. Many of our members must have had interesting experiences with their plants, tried new methods of treatment and so forth, and the best way to pass on information is in the pages of the *Journal*.

At a recent Meeting there was a discussion on the variations amongst specimens of the same species and it was obvious from the examples shown that there is considerable variation amongst plants even when this is not sufficient to warrant the establishment of a new specific or even of a varietal name.

How far the differences are inherent in the plants themselves and how much is due to the conditions under which they grow is difficult to determine. The factors that influence a growing plant are so many and so various that it is impossible to control them all for experimental purposes, but various generalisations

may be drawn. It is common knowledge that plants grown with insufficient light become "drawn"; even with cacti this is a not uncommon occurrence. Anyone who has received imported plants from abroad that have been some considerable time on the journey, is familiar with the long pale growths that even spherical cacti can make; the green colour returns after exposure to the light again, but the form of such plants is damaged beyond repair and they are best treated so as to induce offsets which will be more shapely.

But may there not be a slower and less obvious process at work? What ultimately happens to plants which have been grown in this country for, say, a hundred years and which have been propagated only by cuttings or offsets for that long period? There are quite a number of plants that have been long known in collections but of which there have been no fresh imports, whose very habitat is now forgotten. It seems highly probable that the diminished sunlight of this country, compared with the intense insolation of their native country will ultimately have its effect so that the offspring show some mild form of etiolation, perhaps in a softer skin or less marked succulence.

It is, therefore, most important—and this has not always been done in the past—that descriptions of plants should be made only from specimens that have recently been imported, or better still, made of the plants *in situ* before they are exported.

Some plants change their character much more readily than others. For instance, many of the spherical cacti that have been long in this country still resemble very closely the newly imported specimens of the same species; the skin may be a little greener but the plants remain spherical; they do not quickly become unduly elongated. But take a *Euphorbia* such as *E. caput-medusae*; anyone who saw the Exhibition of South African Flowers at Westminster a few years ago must have been struck by the very fine examples of this species, so different from anything in our collections. The lateral branches were stout and erect, whereas old examples here have slender drooping branches which may grow to a great length (six feet has been recorded) and bear little resemblance to the true character of the plant.

It would be interesting to grow plants of stock that has been a long time in Europe side by side with newly imported ones and see if there is any difference in their behaviour.

Aztekium Ritteri— and Grafting

IN the description of this plant in *Bluehende Kakteen*, Part 35, just issued (see review on page 80), Dr. Werdermann says that *Aztekium Ritteri* is difficult to grow on its own roots, so that it may be of some interest to record our experience with this most attractive and unusual little plant.

In our early days of cactus collecting, we saw the name in a catalogue and, knowing nothing whatever about it, ordered a plant from Germany. This was about nine years ago when the plant had only just been introduced, though that also we did not know at the time. When it arrived the plant consisted of two heads, one slightly larger than the other; it has made no new heads and the original ones have not grown very fast, but they are a beautiful, soft green in colour, the centre filled with wool which is continually being renewed. But best of all, it never fails every year to throw out its lovely little flowers; these are dainty in shape, only the wide-open petals showing above the wool, and in colour they are a pale china pink; several appear together and there is usually a succession for a week or two. The flowers are unusual in that they open earlier in the day than many cacti, often by 7 o'clock in the morning; they close towards evening but re-open for several days.

The seed pods are buried deep in the wool and apparently open there, the seed being pushed out as the wool grows. This seed is very minute, probably the smallest of any cactus and, though it germinates, it appears to be very difficult to get beyond the initial stages of babyhood. Perhaps someone has raised it, but I have not heard of anyone doing so successfully in this country.

The plant itself is attractive; the ribs are decorated with criss-cross furrows which make it look like a piece of Aztec carving (hence the name); the areoles are very minute and the spines, which are thin and papery, are only found in the younger areoles, the older ones being bare of both spines and wool.

This plant comes from Mexico where it was discovered by Fr. Boedeker in 1928; at first he considered it to be an *Echinocactus*, but in the following year he established a new genus, *Aztekium*, of which *Aztekium Ritteri* is the only species.

With us the plant has always been grown on its own roots; the soil has been very

coarse, consisting of heavy loam, broken brick, coarse sand and mortar rubble. It has been repotted a number of times, but not by any means every year, and the roots have always appeared to be in good condition. Probably its rate of growth would not commend it to a nurseryman who wants quick returns, but for anyone who is content to go slowly, and feels compensated by its very charming flowers produced annually, it is well worth while. Not having seen a grafted plant it is difficult—and perhaps rash—to comment; but one would be afraid that too rapid growth might spoil the quaint patterning of the ribs, a risk that is hardly worth taking, seeing that it can be quite satisfactory on its own roots.

* * *

Incidentally, this leads on to the question of grafting. It is said that grafting spoils the character of the scion, but does it—provided the stock is carefully chosen? It may not be unknown that I have a great dislike for grafted plants, and I have never attempted to carry out the operation. But I have from time to time received plants which have been grafted and they do not as a rule do well here; the reason I think is that most of our cacti are grown in a very open soil, which does not suit the freer growing *Cerei* so well, but the stock of a graft is very often a *Cereus*, so that our grafts do not get as much water and nourishment as they could take.

But what are the experiences of other amateurs? Grafting is undoubtedly a useful method of propagating rapidly for sale, but after a few years, what has happened to the scion? Very interesting work has been carried out on grafting in other plants by means of which freaks or "chimeras" are produced, this being partly controllable by choosing the portions of tissue that are united. Does anything of the sort ever happen with cacti? Or is the internal tissue so similar in the various species that it can safely be assumed that the stock will do no more than provide better roots than the scion would make for itself?

If anyone has spare time on their hands, it would be both interesting and useful to treat a batch of young plants, grafting some and keeping others on their own roots, recording the results for a period of years. My own feeling is that the grafts would out-distance those on their own roots, but would they have so long a life? And how about flower production?

VERA HIGGINS.

Book Reviews

"VERZEICHNIS DER ARTEN DER GATTUNG MESEMBRYANTHEMUM L.," by H. Jacobsen; published by the Deutsche Kakteen-Gesellschaft, 1938; price 20 RM.

THIS work, which forms Volume 106 of the *Repertorium* published by Dr. F. Fedde, gives a complete list of the species of the great group *Mesembryanthema*, the original genus *Mesembryanthemum* of Linné, with the genera into which it is now divided; for each species, the synonyms are given, the reference to the first description and the locality where the plant is found.

So complete a list will be of the greatest value to all those who are interested in this genus; the published work on the subject has often been inaccessible and difficult to consult; there has been a certain amount of overlapping by workers in different countries, and the amateur has been left in a very indefinite position, not knowing which names are valid and which have been rejected.

The present work does not solve all these problems, it is not a critical review of the genus; probably the time is not yet ripe for such a review. But it does give a full list brought right up to date of the genera and species as at present recognised.

Probably no one doubts the necessity of splitting up the genus *Mesembryanthemum* L.; according to the present list, it includes some 2,309 species, and 128 genera have been adopted to accommodate them. Those who are familiar with Herr Jacobsen's book *Succulent Plants* will find some changes. Of these, an important one is the spelling of the name itself; in this country, on the authority of Kew, it has been usual to spell *Mesembryanthemum* with a "y," whilst on the Continent and elsewhere the form with the "i" has been in use; but Prof. H. Harms in the article on *Mesembryanthemum* in *Die natürlichen Pflanzenfamilien*, p. 195, considers that the "y" is correct, so that this form is now adopted in Herr Jacobsen's List.

Earlier the genus *Lampranthus* N.E.Br. was submerged in *Mesembryanthemum* as defined by Schwantes; now it is restored (it includes many of the shrubby species) and the genus *Mesembryanthemum* L. as emended by Mrs. Bolus is recognised, in place of *Mesembryanthemum* Schwantes.

In accordance with recent opinions, several genera have been rejected; thus *Argeta petrensis* is considered as belonging to *Gibbaeum*, so that the genus *Argeta* is abolished. *Imitaria* has also gone, *Imitaria Muiri* having become *Gibbaeum Nebrownii* Tisch. The genus *Mentocalyx* proposed by Dr. N. E. Brown is also withdrawn, the two species *Muiri* and *velutinum* being considered *Gibbaeums*; in fact *Gibbaeum* seems to have absorbed a number of species fairly well known in collections, for the *Rimarias Comptonii*, *Heathii* and *Luckhoffii* are all considered by Dr. Bolus to belong to *Gibbaeum*; but the genus *Rimaria* has not disappeared, *R. Primosii*, *R. Roodiae* and others being still included in it.

A complete list, such as this, enables one to get a better survey of the group than has been possible for some time; for instance, there are forty-five monotypic genera though further discoveries may lead to the addition of other species here. The largest genus is *Ruschia* with 307 species, next *Conophytum* 268, then *Mesembryanthemum* L. (emend. L. Bol.) 199, and *Lampranthus* 111. *Lithops* is not nearly so large a genus as *Conophytum*, having only 71 species; there are 50 *Glottiphyllums*, 49 *Argyrodermas*, 30 *Gibbaeums*, 27 *Hereroas*, etc.

A general opinion of such a list can only be arrived at after it has been used in conjunction with the practical problems; but it forms a very useful and much needed ground work and if it could be adopted as the standard of reference, the amateur worker would feel that the problems of nomenclature in this difficult group has been very considerably lightened. All who are in any way interested to have the correct names for their plants owe a very deep debt of gratitude to Herr Jacobsen for his labour in preparing this list in so careful and painstaking a manner. The work is clearly printed, and, by the use of well-chosen types, the names, the synonyms and the references are very easily distinguished. The German Cactus Society is to be congratulated on the assistance they have given towards the publication of this important work.

The book can be obtained at a reduced price of 11 RM. (including postage) by members of the Deutsche Kakteen-Gesellschaft, and of other Cactus Societies. Orders should be sent to the Secretary, Dr. F. Dobe, Am Friedrichshain 3, Berlin NO 43, Germany; payment should be made to the Treasurer, Herr Bruno Güldemann, Sperberfeld 5, Kleinmachnow, Berlin-Zehlendorf, Germany.

"BLUEHENDE KAKTEEN UND ANDERE SUK-
KULENTEN," by Dr. Erich Werdermann ;
published by Neumann, Neudamm ;
four parts per annum. Price RM. 16.

The thirty-fifth Part of this excellent illustrated work deals with four cacti. *Opuntia Verschaffeltii* Cels comes from the Highlands of Bolivia and Argentina ; unlike many of the *Opuntias* from South America this species grows well in cultivation and also produces its lovely scarlet flowers ; the specimen from which the photograph was taken was imported in 1931 and flowered in the Dahlem Botanic Gardens in 1936. *Acanthocalycium Klimpelianum* Bckbg. nov. comb. was originally described as an *Echinopsis*, then changed to *Lobivia* and finally to *Acanthocalycium* ; it was discovered in 1926 by Dr. Hosseus and has been found again by later collectors but is still rare in collections ; in habit the plant resembles an *Echinopsis* but the flowers are borne near the centre and are almost pure white. *Frailea asterioides* Werdermann is a small plant, growing in clumps and looking very much like a tiny *Astrophytum asterias*, but the skin is chocolate brown instead of green ; the flowers are very large and yellow. The few plants collected by H. Blossfeld and O. Marsoner in 1936 are all in the Dahlem Gardens, but seed is freely produced and is in commerce. *Aztekium Ritterii* Boedeker was first discovered and introduced in 1927 ; the structure of the plant is most unusual ; instead of the more general ribs or tubercles, the ridges look as if decorated with plaiting and the name *Aztekium* was given to it because of its resemblance to the Aztec carvings. Dr. Werdermann says that it is difficult on its own roots.

"FLOWERS OF THE DESERT," by H.A. Day ;
published by Methuen & Co., Ltd. ;
price 5/-.

Another book on the cultivation of cacti and other succulent plants would be most welcome, but unfortunately the present work can hardly be recommended as likely to prove helpful to the beginner ; the more advanced grower will find too many errors in those sections with which he is familiar to trust others where he would like information.

Part I deals with cacti under pseudo-English names such as Wax Cacti, Thistle Cacti, Wickerwork Cacti, but this does not save the novice much, for all the Britton and Rose genera are used. Part II covers the Cactus-like Succulents, i.e. *Euphorbias* and

Stapelias ; growers of *Euphorbias* may like to know that the cultivation of them is "generally easy" and that "cuttings will root easily as with Cacti" ; if only this were so ! The author guards himself by saying that "this book is *not* in any sense an attempt at botanical classification or the affording of botanical information" which is just as well, otherwise why class *Fockea* and *Sarcostemma*, both *Ascelpiads*, with the *Euphorbias*, and, later, *Sarcocaulon* which belongs to *Geraniaceae* with the *Stapelieae* ? *Stapelias*, by the way, are also "of very easy culture."

Part III deals with "Rosette" Succulents, *Haworthias*, the *Crassula* Group, *Houseleeks* and *Stone crops* ; those interested in the *Echeverias* may like to know that *E. leucotricha*, *pulvinata* and others are now included in a so-called new genus *Globosa*, but no authority for this information is given, which is hardly surprising as the name occurs only as an obvious misprint in a well-known catalogue !

Part IV deals with the Mid-day Flowers which most of us call *Mesembryanthemums* (the name when spelt with a "y" does *not* mean "mid-day" at all, but "flowering from the centre," and many of the species flower in the evening and even at night). For the rare types, including the *Lithops*, "the temperature must never fall below 60 degrees." As a practical point, the author recommends the use of a steel-framed greenhouse ; this is an excellent type of house as it gives the maximum of light but a metal structure does not conserve the heat like a wooden or brick-based one, and the cost of keeping such a house at 60° F., even if it were necessary, when the outside temperature is thirty degrees lower would surely be very considerable.

It is a great pity that this book is unlikely to fulfil the author's intention of encouraging more people to grow succulent plants. To anyone familiar with the literature of the subject, the sources of information are obvious, but they have been adapted by someone with no practical knowledge of the plants themselves and, moreover, with, apparently, no idea whatsoever of what plants are available in commerce. Anyone who specialises in unusual plants cannot depend entirely on the dealers for his supply, but gets into touch with people with like interests in various parts of the world ; even so, he would probably find it difficult to obtain, for instance, *Aloe polyphylla*, of which there are three specimens only in this country at the moment, or *Euphorbia handiensis* or *Zygophyllum Fontanesii*.

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