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PUBLISHED BY THE CACTUS AND SUCCULENT SOCIETY OF
GREAT BRITAIN AT 28 NORTHAMPTON ROAD, CROYDON

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All communications with regard to the *Cactus Journal*, including advertisements, should be sent to the Editor.

ANNUAL SUBSCRIPTION 10/-.

The *Cactus Journal* is published quarterly and sent free to all Full Members of the Society. Persons living abroad who are unable to take advantage of the other privileges of membership, may receive the *Journal* for six shillings per annum; applications, with the amount due for one year's subscription, should be sent to the Hon. Editor. Distribution of the *Journal* will be through the Society only.

ADVERTISEMENT RATES.

Whole page	- - £2 10 0	Quarter page	- - - 12 6
Half page	- - £1 5 0	Eighth page	- - - 7 6

10 per cent. reduction for four or more consecutive insertions.

The *Cactus Journal* is published quarterly on the 1st of March, June, September and December; copy should reach the Editor at least one month before the date of publication.

THE CACTUS JOURNAL

VOL. 8.

SEPTEMBER, 1939.

No. 1.

Cacti—Hybrid, Grafted and Monstrous

By Mrs. J. Russell

(Talk given at the Meeting held on July 18th, 1939.)

TO start with the normal cactus—we have here merely a straightforward flowering plant with a root, stem and leaves, as natural as a buttercup. But, while the buttercup has two kinds of leaves, the green leaves and the floral leaves, among cacti the former are nearly always missing or reduced, their part in assimilation and transpiration being taken by the stem which is modified into an almost infinite variety of forms. Strange to say, among cacti, there is no great diversity in the form of the flowers and, though we have the short, rather papery blooms of the mammillarias, the fleshy flowers of the gymnocalyciums with their large smooth scales, the beautiful trumpets of the echinopses with the scales reduced to hairs, the hose-in-hose effect of *zygocactus* and *ariocarpus*, yet the flowers differ very little from one another in structure, and it is these flowers, and these flowers alone, which make a cactus a cactus and differentiate it from all other flowering plants. There is a great range of colour in the flowers, but no blue and no mauve or violet shades, but there are tones in the yellow to red range which probably occur nowhere else. There are also some remarkable “off-whites” and greens.

Now to deal with the hybrids. Why do you want hybrid cacti?

The two main excuses of horticulturists for hybridisation are, first, to improve the constitution of a wild plant which is not quite thrifty in our gardens, particularly in our rock gardens, and secondly, to enlarge the flowers and improve their colour. But neither of these excuses can hold good for cacti. They are with few exceptions reasonably hardy if given a fair chance, and as for size and colour of the flowers, all I can say is, look at your own collection now in bloom and try to

think if you could better the colour. And some of the night-flowering cerei have flowers fourteen inches across.

The number of species of cacti is about 1,500, subvarieties often classified as different species bring this to nearly 4,000. Are these not enough? Or do you wish to add to the number by making new hybrids? All hybrids are not unnatural; a certain number do occur in nature, for instance, even collected plants of *Astrophytum myriostigma* are frequently spiny hybrids and not the true spineless type, and seedlings from these will generally show a proportion of plants true to type. This natural hybridisation is not uncommon in areas which are cut off and isolated by physical conditions, particularly in valleys separated by barren rock or glacier, or on islands; under the same conditions local varieties in the same species sometimes occur, and the cactus specialists, with their usual enthusiasm, have made sub-species and species of what among other flowering plants would have merely been noted as varieties.

Some of the oldest known cacti in this country are the phyllocacti, epiphyllums and certain easy-flowering echinopses. They have survived the overwatering and overheating of the Victorian hot house and conservatory, lived in cottage parlours during the period when the cactus was in eclipse, and their cuttings and offsets, actually parts of the same plants which were thriving in this country a hundred years ago, are once more restored to honour in our cactus houses. These plants are nearly all hybrids, so perhaps on the score of hardiness we should allow the hybrid cactus a place.

But the point I wish to emphasise most is this; our cactus houses are a sanctuary where many very rare cacti have a home, safe from disaster of fire and earthquake, safe from the spread of civilisation which has put an end to so many natural species all the world over; and, if we take more interest in the hybrid than in the true species, so we run the risk of losing these natural species and, once lost to the world, they can never be replaced. Some species of wattle or mimosa have been destroyed by fire in Australia within living memory, and now only exist in botanical gardens and private collections. Be content with natural species. Don't worry if the fine blooms of *Gymnocalycium venturianum* are a dirty white and, if the hybridist offers you a nice *Gymnocalycium venturianum* hybrid with pink flowers instead of dirty white, have nothing to do with him and be content, for you have the real thing, the other is a fake.

Next, we come to grafts. What are the advantages of grafts?

The best-known grafted plants are our ordinary fruit trees and roses. The latter (not strictly grafts but produced by the similar process of budding) are claimed to be hardier than roses on their own roots. Anyone who has grown roses from cuttings knows that there is little foundation for this claim, though the grafted plants do bloom sooner than those on their own roots. But the chief reason for them is that a number of plants of a new variety can be rapidly produced and sold. Apples and pears cannot be grown from cuttings, so must be grafted on suitable stocks. Again, as for roses, numerous scions can be cut from one new seedling variety. In our flower gardens the chief aim of grafting seems to be to turn into trees plants which nature intended for shrubs, and so we get such monstrosities as brooms grafted on to laburnum stocks.

Let us turn to cacti and see what the advantages and disadvantages are. First, certain imported cacti can only be induced with difficulty to make new roots when replanted, some do not root at all, for instance, *Peniocereus Greggii*, *Opuntia*

clavarioides. Secondly, many trailing or slender-jointed species must be grown in hanging pots if they are to be on their own roots. The growers of grafted zygocacti claim that these make better plants on cereus or pereskia stocks; nevertheless, if they are rooted from a good straight joint they make fine bushy plants, and the largest zygocactus I have ever seen, which lived in a hotel window north of the Arctic Circle and measured over four feet across, was on its own roots, and the lower part of the stem had become so fibrous and rigid as to form an almost tree-like trunk. *Aporocactus flagelliformis*, on its own roots, has the advantage that branches over two years old, which are generally becoming brown and unsightly, can be cut away to the ground without disfiguring the plant. As the "tails" grow as much as three feet long, a suitable stock might be a little difficult to find.

Thirdly, it is sometimes objected that rebutias flower too close to the ground, and that a short stem raises them sufficiently for the blooms to show at their best; but if they are grown on their own roots in a wide-topped pan with plenty of gritty top dressing, what can be neater than a squat little rebutia with its ring of brightly coloured flowers rising from the level of the ground and almost covering over the body of the plant. Grafting is also used as a means of propagating cristates and similar deformities, but of this I shall speak later. These do not usually flower, and if anyone wants these pathological specimens some means must be found of reproducing them artificially.

Apart from the fact that grafts are unnatural, there seems some danger that the stock must affect the form of the scion; for instance, fleshy, quick-growing cerei are bound to affect the form of the plants grafted on them. Some of you will no doubt arise indignantly against me when I say this, but I have never seen a grafted rebutia which had the neat, compact form of a seedling or offset. My own *Rebutia Marsoneri* had forty-two flowers on a single-headed plant this year, on its own roots; could a graft have done better? I have even heard it claimed as an advantage for grafts that "they make finer and larger plants." If it is in the nature of a plant to measure two inches across and one and a half inches in height, why rejoice because you have a bloated specimen which is four inches high and three inches wide?

Prof. Borg, in his book *Cacti*, makes the following remark (p. 38): "Continental nurserymen very generally graft species of *Zygocactus*, *Schlumbergera* and *Rhipsalidopsis* on rooted cuttings of *Peireskia grandiflora* and *P. aculeata*. However, experience has shown that in Southern Europe and also in the Maltese Islands, these grafts on *Peireskia*, though they unite well, never thrive properly and never grow into such magnificent specimens, producing annually several hundreds of flowers, as they do when grafted on *Selenicereus Macdonaldae* or on *Cereus triangularis*." This certainly suggests that the choice of stock influences the plant resulting from the graft; which will not surprise anyone who is growing modern fruit trees. One of the best instances is the well-known apple "Lane's Prince Albert"; early grafts of this were made, I believe, on the native Hertfordshire crab, and it got a bad reputation as an orchard tree for its unmanageable, twisting and straggling growth; this growth was apparently acquired from the crab stock. Now, on a modern dwarfing stock, it makes a neat little tree, erring if anything on the size of compactness.

It is just in the fact that a more succulent and vigorous stock will give strength to a cactus of weak growth that the danger lies, and, if your cacti are to remain natural rather than monstrous cacti, grafts should only be admitted to a collection

when all other means of producing a natural plant of the required cactus have failed. The last word has not yet been said on "bad rooters," and so long as you take the easy way out by grafting you will not discover a method of rooting them.

Last of all I will speak against monstrous cacti. Until recently the chief of these were cristates and many-headed plants, but unfortunately a new horror has come to us (I believe from Northern Europe) in the form of the variegated cactus. In the past it was the custom of the wealthy to collect abnormal and deformed human beings; and kings and noblemen treasured these unfortunates as rare and valuable possessions. Until a few years ago travelling shows exhibited to the simple countryman two-headed calves and four-legged chickens, to say nothing of the fat women and living skeletons. While we are sufficiently enlightened to turn away from such horrors, some of us still delight in diseased and deformed plants. Variegated plants have their admirers, although variegation is frequently the result of virus disease and, as such, highly contagious. I have known the variegation of the golden or white streak type spread from a hedge to other trees in a shrubbery, and it is possible to infect a whole plantation of naturalised tulips by introducing a few of the streaked "bijbloemen." There are also a number of variegated cacti, mostly *Chamaecereus Sylvestrii*; these are pale yellow, grafted on a streaked or green cereus stock. Now what interest could these have to a healthy-minded collector of cacti? Their place is in a pathological museum. There are few more charming cacti than *Chamaecereus Sylvestrii* with its neat reddish-green joints bearing large scarlet flowers, and flowering at intervals for three months of the summer, and rooting so easily that joints knocked off root themselves at any angle on the surface of the pot. So, as an improvement, we are offered chlorotic growths, without flowers, grafted.

Next, come many-headed plants, and to what extent these are abnormal is hard to say. Succulents (including cacti) are by their nature plants which have adapted themselves to unnatural conditions—conditions which are so hard as to make it impossible for plants not so adapted to live. Even in our gardens, abnormalities such as hen-and-chicken flowers, fasciated stems and so on nearly always occur after long periods of drought; they were, for instance, very prevalent in the summer of 1938, so it is not surprising that some cacti should show so many deviations from normal cactus growth.

Double heads are extremely common in mammillarias. Some of these start immediately after the cotyledon stage, and two growing points instead of one are formed, so that in a very short time we have a double-headed plant with two perfect globular stems on one root. As far as I know these produce normal seedlings, but it would require controlled experiment over several generations to prove whether this abnormality could be inherited or not. Some mammillarias do not split until about the second year of growth from the seedling stage. They never make two perfect heads, but remain forever as a siamese twin, though otherwise they grow and flower normally. *M. Parkinsonii* and *longicoma*, among others, are bad offenders in this respect. Grouped clusters are probably a normal method of vegetative reproduction in certain species and under certain conditions; but in some cases offsetting from the base of the plant seems to be the result of a check in growth, and is therefore, to some extent, an abnormality. Last year (1938) I took one out of a batch of *Rebutia minuscula* seedlings just coming into flower bud, and repotted it to give away, promising the recipient that "if it doesn't flower this year, it will next." It dropped its buds, and this year, instead of flowering, it has produced a

ring of offsets. It has been treated exactly like the others out of the same batch, and all these have flowered normally. Was this change to vegetative production by offsets the result of a check to growth? I have had the same experience with *Dolichothele longimamma*.

When it comes to cristates, which are much sought after by many cactus fanciers, and are a great source of profit to continental growers, I can hardly bring myself to speak calmly. To my mind they are indecent atrocities, only to be paralleled by the double-headed calf and the four-legged chicken of the country fair. They are horrible and all more or less alike, a fan or a tightly curled coxcomb crest, distorted almost out of recognition of the species, generally grafted on top of a tall column of cereus. Some of them are so ashamed of their unnatural state that, if on their own roots and growing in plenty of soil in a roomy pot, they attempt to revert to the normal and produce non-cristate offsets.

Cristation is a form of fasciation or the formation of numerous buds from one growing point. As I wished to have up-to-date information on the subject of fasciation, I wrote to Prof. Salisbury, Professor of Botany at London University, and received the following note: "Fasciation usually occurs when a period favourable to photosynthesis and food accumulation but unfavourable to growth is followed by conditions (e.g. increasing moisture) which favour rapid growth. The elements formed under these conditions may become mechanically fixed." So that after suffering misfortune the miserable plant may not be able to recover, but continues to distort itself until uprooted by a collector and sold to a nurseryman who, seeing in it a source of profit, cuts it into as many pieces as possible, grafts them on to cereus or, in the case of opuntias, on to opuntia stock, and sells them to be the pride of a cactus collection. Can you possibly call these things anything but monstrosities? Many cacti grow under such rigorous conditions that abnormalities and distortions occur; but the fact remains that a cactus at its best is a natural flowering plant, and disease and deformity are no more its inheritance than they are the inheritance of the child living in a damp and sunless slum cellar.

I would like to end with three quotations, the first probably familiar to you all, from Prof. Borg's *Cacti*, p. 40: "Fasciated plants often produce flowers which, however, are generally reduced in size and usually defective or malformed, and hardly ever produce fertile seed."

The second is from Forest Shreve, who is in charge of the Desert Laboratory at Tucson, Arizona, speaking of grafts and cristates: "The great vogue of cristate cacti betokens a strong collecting instinct rather than the possession of the highest aesthetic taste and the purest appreciation of nature; there is no circle of dog fanciers devoted to animals with four ears or two tails. The same love of the grotesque that has made cristates popular has also furthered the art of grafting. Both of these popular features are due to the relative newness of the cactus hobby, and it is safe to predict that they will finally pass into the same limbo of oblivion that long ago took from us our bushes trimmed to resemble dogs or birds."

And lastly, from Prof. Walter Raleigh's words against artists, which apply equally well to hybridists, grafters and makers of cristates:

"They fiddle with the works of God
And make them seem uncommon odd."

The Cactus Exhibition

ON June 20th and 21st, 1939, the seventh Annual Cactus Show was held in the Royal Horticultural Society's Old Hall. The schedule has been revised, which may have accounted for the greater number of entries than in previous years, but one prefers to think that the success of this show was due to a greater enthusiasm among a greater number of members and to hope that this will be maintained so that subsequent exhibitions will show an advance on their predecessors as this one has definitely done.

The successful competitors in the various classes are given below; the number in brackets shows the number of entries in each class.

Class 1. *Decorative Group*. 1st, P. V. Collings; 2nd, S. C. Roughton; 3rd, Mrs. J. Gascoigne; H.C., Miss B. Stewart. (4.)

Class 2. *Nine Mammillarias*. 1st, P. V. Collings; 2nd, S. J. Pullen; 3rd, W. Joyce; H.C., G. Turner. (6.)

Class 3. *Nine Cerei and/or Echinocerei*. 1st, P. V. Collings; 2nd, Dr. Turtle; 3rd, S. J. Pullen; H.C., G. Turner. (5.)

Class 4. *Nine Echinocacti*. 1st, G. Turner; 2nd, P. V. Collings; 3rd, H. N. Minchin; H.C., G. A. Snelling. (5.)

Class 5. *Nine Echinopses, Rebutias and Lobivias*. 1st, G. A. Snelling; 2nd, S. J. Pullen; 3rd, D. J. Cansdale. (3.)

Class 6. *Twelve Cacti*. 1st, P. V. Collings; 2nd, G. Turner; 3rd, F. Ducrocq; H.C., W. F. Athawes. (5.)

Class 7. *Specimen Cactus*. 1st, P. V. Collings; 2nd, H. N. Minchin; 3rd, F. Ducrocq; H.C., G. Turner. (9.)

Class 8a. *Mr. Boarder's Seedling (1935)*. 1st, K. H. Walden; 2nd, F. E. Rapp; 3rd, Miss E. M. Ash. (5.)

Class 8b. *Mr. Boarder's Seedling (1938)*. 1st, A. de Bois; 2nd, Mrs. Cutler; 3rd, H. N. Judd. (7.)

Class 9. *Cacti from Seed sown on or after Jan. 1st, 1937*. 1st, A. de Bois; 2nd, K. H. Walden; 3rd, E. C. Malet-Warden. (5.)

Class 10. *Cacti from Seed, more than two years old*. 1st, A. Boarder; 2nd, F. E. Rapp; 3rd, P. V. Collings; H.C., W. F. Athawes; C., K. H. Walden. (6.)

Class 11. *Miniature Garden*. 1st, S. C. Roughton; 2nd, E. C. Edwards; 3rd, L. Barlow-Massicks; H.C., A. J. Cook. (9.)

Class 12. *Twelve Succulents*. 1st, P. V. Collings; 2nd, F. Ducrocq; 3rd, A. Cuming. (5.)

Class 13. *Nine Euphorbias*. 1st, H. N. Minchin; 2nd, S. J. Pullen; 3rd, Miss H. Mackenzie. (3.)

Class 14. *Nine Mesembryanthemums*. 1st, P. V. Collings; 2nd, Capt. Dunne Cooke; 3rd, T. King. (4.)

Class 15. *Nine Mesembryanthemums, Mimicry Types*. 1st, P. V. Collings; 2nd, Capt. Dunne Cooke; 3rd, E. C. Malet-Warden. (3.)

Class 16. *Nine Aloes, etc.* 1st, G. A. Snelling; 2nd, F. Ducrocq. (2.)

Class 17. *Nine Haworthias*. 1st, S. J. Pullen; 2nd, Miss Mackenzie; 3rd, F. Ducrocq. (3.)



Fig. 1.
Cactus Exhibition.



Fig. 2.
Cactus Exhibition. Class 10. First Prize.



Fig. 3.
Cactus Exhibition. Novice Classes.



Fig. 4.
Cactus Exhibition. Euphorbias.

Class 18. *Nine Succulents not specialised above.* 1st, Miss Mackenzie; 2nd, A. W. Thorpe; 3rd, F. Ducrocq. (3.)

Class 19. *Succulents from Seed sown on or after Jan. 1st, 1936.* 1st, L. Barlow-Massicks; 2nd, Mrs. Cutler; 3rd, E. C. Malet-Warden. (3.)

Class 20. *Succulents from Seed, more than two years old.* 1st, F. E. Rapp; 2nd, L. Barlow-Massicks; 3rd, Mrs. Cutler. (3.)

NOVICE CLASSES.

Class 21. *Twelve Cacti and/or Succulents.* 1st, A. Cuming; 2nd, C. Butler; 3rd, Mrs. J. Russell; H.C., H. N. Minchin. (5.)

Class 22. *Six Cacti.* 1st, Miss R. Haskins; 2nd, Mrs. J. Russell; 3rd, Mrs. J. Gascoigne; H.C., Miss D. M. Poore. (9.)

Class 23. *Three Cacti.* 1st, H. N. Minchin; 2nd, C. Butler; 3rd, Miss D. M. Poore. (9.)

Class 24. *Six Mammillarias.* 1st, Mrs. J. Russell; 2nd, G. A. Snelling; 3rd, H. N. Minchin; H.C., C. Butler; C., D. J. Cansdale. (11.)

Class 25. *Six Aloes, etc.* 1st, Capt. Dunne Cooke; 2nd, A. J. Cook; 3rd, H. N. Minchin. (3.)

Class 26. *Six Succulents, any one Genus.* 1st, Capt. Dunne Cooke; 2nd, Mrs. J. Russell; 3rd, A. W. Thorpe. (10.)

The Lawrence Cup, which is now awarded to the exhibitor who wins the greatest number of points in the Senior Classes, went to Mr. P. V. Collings. The Evelyn Theobald Cup, now awarded to the exhibitor who wins the greatest number of points in the Novice Classes, went to Mrs. J. Russell, and the Miniature Garden Cup was awarded to Mr. S. C. Roughton.

There were several interesting non-competitive exhibits; Miss Mackenzie had a number of *Rhipsalis*; Mr. W. Denton showed beautiful pans of mimicry *Mesembryanthemums* and similar plants; Dr. Turtle showed a number of fine cacti in flower or bud; Miss F. M. Gibbs had a group of good *Mammillarias* and *Euphorbias*, whilst Mr. G. Turner showed *Coryphantha cubensis*, which was first discovered by Dr. J. A. Schafer in 1909 and in 1912, but not again until 1938, when Prof. Leon found it at the type locality, south-east of Holguin, Oriente, Cuba.

A number of firms staged exhibits; Southgate had a good representative collection of plants, chiefly succulents; Harle included a large number of seedlings, and had pads of *Opuntia Bergeriana* bearing scarlet flowers; Musto showed interesting *Crassulaceae*, *Phyllocacti*, and had fine plant of *Bowiea volubilis* in flower; Neale had small cacti, and some very good large specimens, such as tall *Cerei*, and a remarkable group of *Echinocereus Engelmannii*; Docwra had an unusual collection of grafted plants, whilst Lawrence specialised in seeds and books on the subject.

Haywards were again showing their excellent small greenhouse and frames; Chase had small cloches and their specially constructed greenhouse; the Gloucester Incubator Co. were showing metal gardening boxes and a greenhouse heater; West had a large number of useful sundries; the Eclipse sprayer was being demonstrated, and Wheldon and Wesley had a good display of books.

The *Cerei* shown in Fig. 11, page 18, were grown on from the seedling stage by Mr. A. Bailey.

Cacti of Southern Peru

By Dora Stafford

With descriptions by A. A. Bullock

WHEN I first went to Peru, the dry coast hills seemed to me to be a natural setting for cacti. Under the hot sun in the sandy hills round Arequipa, they also seemed to be quite at home, but as I climbed the cacti came with me until at last I found them flowering in the snow.

They grow in every locality and at every height from sea level to over 15,000 feet, except in the strip of desert that divides the coast hills from the lower slopes of the Andes. They seem to thrive under the most unlikely weather conditions, such as heavy rain, hail and snow storms during the day and many degrees of frost at night.

On the coast up to 3,000 feet there is a season of mist from May to October, and the cacti flower at various times throughout the year. The surface soil is sand mixed with volcanic ash, blown down from the volcanoes El Misti and Ubinas, and sea shells brought up by tidal waves. Of the recumbent species, *Islaya islayensis* appears to be very hardy. It is named after a small port to the north of Mollendo where I first found it, and as I came across it again in quantity near Ilo, fifty miles further south, I imagine it is fairly common at sea level. A small specimen amongst my dried collection seemed in good condition, so it was put in sand where, after a short time, it started to grow and make fresh roots. It was left, by mistake, in an unheated house during the severe frost of last December, but was unharmed and is now making fresh growth.

Neoramondia macrostibas (see p. 11), and the *Cereus* types grow in the valleys which wind up through the hills. They are covered with thick mats of lichen (*Usnea* species), and surrounded by *Tillandsia latifolia*.

Neoramondia macrostibas (*K. Schum.*) *Britt. et Rose.*—Plant often much branched from the base, 2-4 metres high, very stout, with comparatively few ribs; areoles very large, about 1-2 cm. in diameter, globose or often cylindrical, spines up to 12 or even more at an areole, up to 24 cm. long and proportionately stout. Flowers geminate or solitary, produced year after year from the same areoles, 2.5-4 cm. long, funnel shaped, stout, inner perianth segments about 1 cm. long; stamens white, included; style short, white; stigma-lobes pink or pinkish. Fruit globose, up to 7 cm. in diameter, purple; the brown, woolly areoles falling as small brown balls; pulp red, edible; seeds numerous.

This plant occurs on the borders of the barren deserts through western Peru, and was collected by MISS STAFFORD (Nos. 830 and 837 in herb. Kew.) at Mollendo in July and September, 1937.

The specific epithet refers to the peculiar areoles, which are unique in the Cactaceae. The plant was first described by K. Schumann in 1903, as *Pilocereus macrostibas* from material collected at Mollendo.

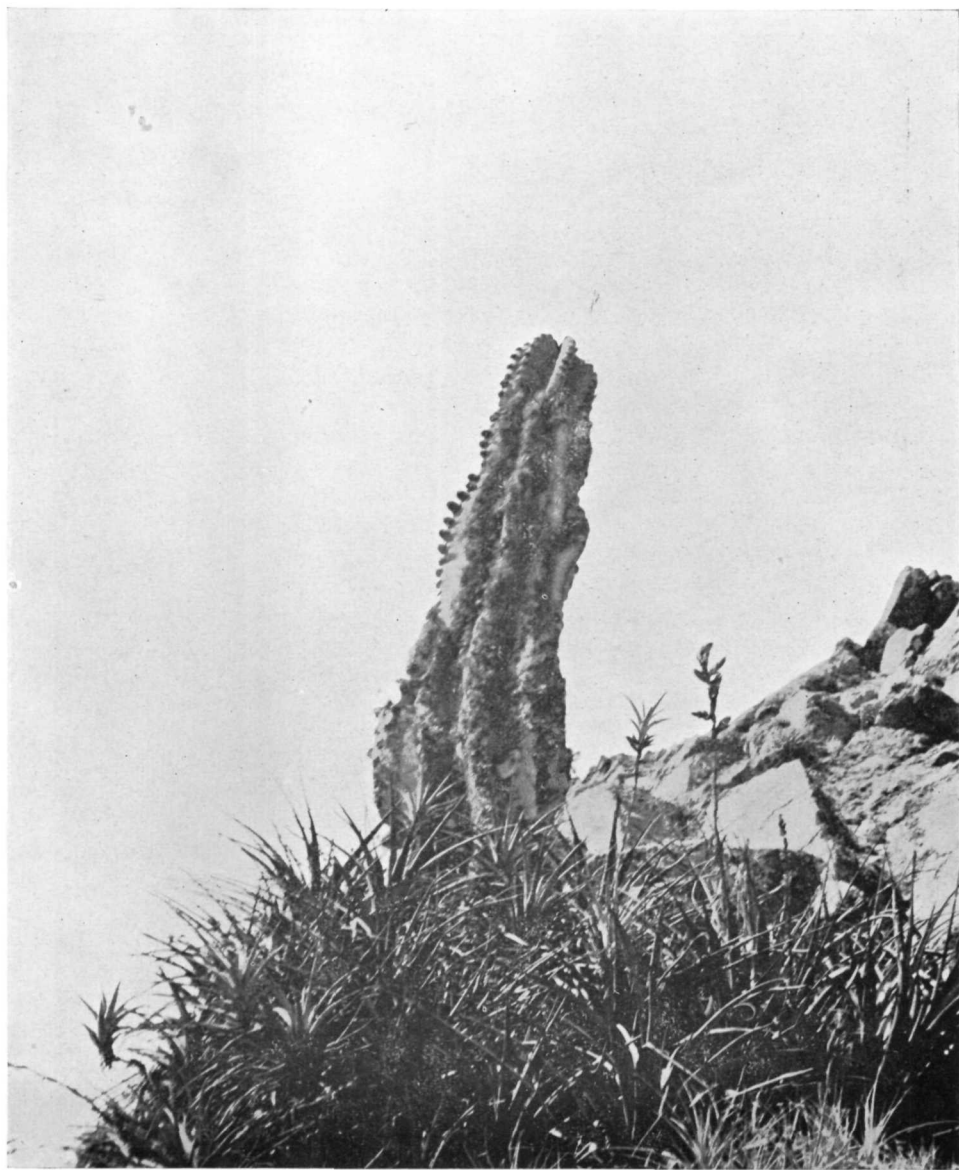


Fig. 5.

Neoramondia macrostibas.

(see page 10)

D. Stafford.



Fig. 6.
Opuntia Staffordae.
(see page 15)

D. Stafford.



D. Stafford.

Fig. 7.
Borzicactus decumbens.
(see page 15)



D. Stafford.

Fig. 8.
Lobivia longispina.
(see page 16)

The Arequipa district is rich in cacti. Here there is a season of rain from January to March and slight frost at night during the months of May and June. From 6-8,000 feet *Browningia candelaris* tops every hillock, and bears fruit which is thirst-quenching to travellers over the desert. *Opuntia Staffordae* (see p. 12) blooms after the rains on sandy pampas from 8-11,000 feet.

Opuntia (§ Tephrocactus) Staffordae *Bullock*.—Plants about 15 cm. high, with not more than two or three segments per stem; segments ellipsoid or somewhat flattened, 3-4 cm. long, 2-2.5 cm. wide; areoles numerous, comparatively large, semiglobose, in the dried plant sometimes almost contiguous; spines 4-10 per areole, straight, acicular, up to 2.5 cm. long, orange-brown when young, becoming grey in age; glochids very numerous, white or cream, becoming pale grey in age. Flowers orange, about 2.5 cm. long, tube covered with glochidiate but spineless areoles, conical, about 1 cm. long and 1 cm. in diameter at the throat; tepals about 1.5 cm. long, obovate, truncate, cuneate.

Discovered by MISS STAFFORD in Peru, during 1937, when she made three gatherings: Sandy slopes on the hillside at Cachendo, Arequipa, at 1,000 m. altitude, Nov., No. 1030. Yura, 2,400 m., Aug., No. 856. San Antonio de Esquilache, 4,200 m., Aug., No. 866.

(This is a new species and a latin diagnosis will be published at an early date in the *Kew Bulletin* in order to validate the name in accordance with the International Rules.)

In the Chuquibamba, Condesuyos district, at 8-10,000 feet, one comes across *Borzicactus decumbens* trailing in the sand or rearing up from rocky ledges. It seems to flower from December to April.

Borzicactus decumbens (*Vaupel*) *Britt. et Rose*.—Plant caespitose, procumbent or somewhat ascending; branches 3-4 cm. in diameter; ribs numerous but almost hidden by closely interlocking spines; areoles approximate; radial spines about 30, 3-6 mm. long, central spines few, 0-5, larger and stouter than the radials. Flowers scarlet or orange, about 8 cm. long, with a slender tube gradually expanding to the funnel-shaped throat, axils of the tube scales with long, silvery-white, weak hairs, the limb about 5 cm. in diameter, tepals oblong to oblanceolate.

First found by Weberbauer in 1902 at Mollendo, and collected many times in rocky sandy places on the hills of south-western Peru and north-western Chile. It was collected by MISS STAFFORD (No. 1153 in herb. Kew.) at Huario, below Chuquibamba, Condesuyos, at an altitude of 1,350 m., in sand on a bare hillside.

At 12,500 feet and over in the hills and on rocky moorland between Lake Titicaca and Lake Uyumayo, one finds *Lobivia longispina* (see p. 14) and other species of *Lobivia*, which are mostly rock loving. The period of rain here is long and lasts from December to April, and during the months of June, July and August the frost at night is severe and falls as low as 2 degrees F. The cacti start to flower in August, one of the coldest months of the year. *Opuntia campestris* forms large cushions in the turf on the pampas, and *Opuntia Pentlandii* is found growing on high ridges and on walls which enclose the small holdings of the Indians. No doubt they were originally planted there to protect the owners' potatoes. Higher still on

the bleak pampas at 13-14,000 feet, one can see what appears at first sight to be a flock of sheep, but which is actually a group of *Opuntia floccosa*. It is in flower in September and October.

Lobivia longispina *Britt. et Rose.*—Plant body globose to shortly cylindrical, up to 10 cm. in diameter and 25 cm. high, but often smaller, bluish-green in colour and with 25-50 ribs; spines 10 to 15 from each areole, slender, elongated, slightly up curved or nearly straight, the longest 7 to 8 cm. long, but usually shorter, yellowish to brown. Flowers funnel-shaped, 3.5-5.5 cm. long, tube slender, with numerous long white hairs arising from the axils of the tube scales. Fruit obovoid, about 2 cm. in diameter, with widely spaced ovate, acuminate, scales, 3-4 mm. long.

First collected at La Quiaca, Jujuy, Argentina, by J. A. Shafer, in 1917, at an altitude of 3,450 metres. It is evidently fairly widely distributed, and was collected by MISS STAFFORD (No. 949 in herb. Kew.) between Juliaca and Puno, Peru, in December, 1937, and also at San Antonio de Esquilache, Puno (No. 874 in herb. Kew.) in August, 1937.

This is one of the species which has been transferred to the genus *Echinopsis* by Backeberg. The reasons given for the transference seem, to the writer, inadequate, and he prefers to retain it as a species of *Lobivia*. The specific epithet is self explanatory.

In the warm valleys, at 10,000 feet, between the high ranges, where the rainfall is heavy from December to April, but the frost is at no time severe, *Trichocereus cuzcoensis* (see p. 17) is used to fence in the fields of wheat, and *Erdisia squarrosa* forms low barriers to cultivated land. Both grow naturally in the protection of shrubs such as *Berberis* and *Dunalia*. The flowers are at their best in November and December.

Trichocereus cuzcoensis *Britt. et Rose.*—Much branched, tall, columnar cactus 2 to 4 metres high, the branches somewhat spreading or erect; pale green when young; ribs about 8-10, low and rounded; areoles about 1 cm. apart, with numerous, often very stout spines up to 6 cm. long and swollen at the base. Flowers white, very fragrant, apparently opening at night but often remaining open during the following day, 11-15 cm. long, the tube green, 5-6.5 cm. long, inner perianth segments oblong, white, 5-7 cm. long; filaments declinate, scales on the ovary and perianth-tube, small, with a few long weak hairs in their axils.

First collected below Cuzco by Dr. J. N. Rose in 1914, and re-collected at the same place by MISS STAFFORD (No. 1162 in herb. Kew.) in December, 1937.

This species does not call for special comment, except as a representative of a growth-form characteristic of Peru. MISS STAFFORD obtained only flowers in her herbarium material, but these, studied in conjunction with her photograph, leave little doubt that the identification is correct.



Fig. 9
Trichocereus cuzcoensis.
(see page 16)

D. Stafford.

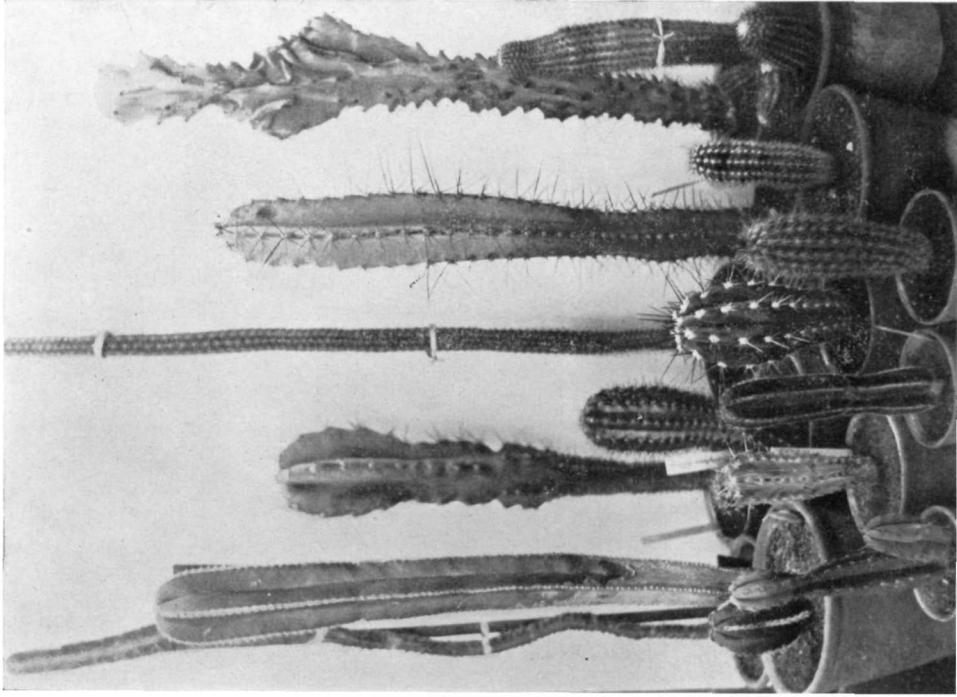


Fig. 11.
Cerei from seed.
(see page 9)

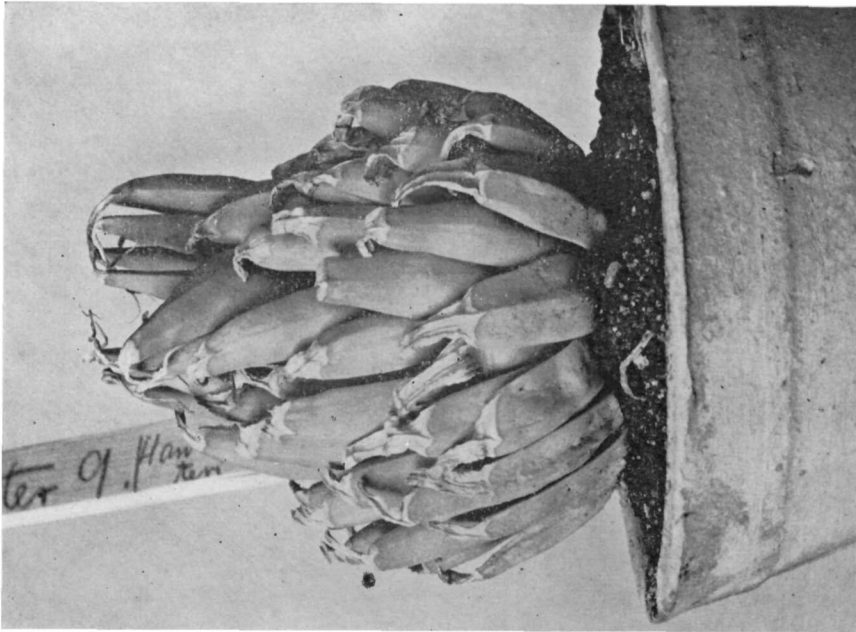


Fig. 10.
Haworthia Venteri, v.P.
(see page 19)

A New Species of Haworthia

By Karl von Poellnitz

HAWORTHIA VENTERI von Poellnitz, sp. nov.—Differt *Haw. angustifolia* Haw. foliis ad margines et carinas plerumque omnino integris et ad apicem seta terminali longa instructus.

Acaulescent, somewhat proliferous from the base. Leaves very numerous, nearly erect or ascending, a little incurved at the tip, straight, 50-60 mm. long, 8-10 mm. broad towards the base, lanceolate and a little ovate at the base, gradually and longly acuminate, with a simple, curved, rather light terminal awn about 10 mm. long, grey green or somewhat brownish green, not shining, not pruinose, with some darker, but still inconspicuous longitudinal lines, rather rigid, a little rough on account of the outer cell walls of the epidermis being prominent; face nearly flat towards the base and the tip, otherwise convex; back very convex, with an obtuse keel almost in the middle from the leaf-base or from the middle, mostly also with 1 (-2) inconspicuous and very obtuse keels towards the leaf-margins; keels and margins mostly completely smooth, rarely with very few, minute, tooth-like tubercles seen only under a strong lens. Flowers unknown at present.

South Africa: In the neighbourhood of Worcester, Swellendam, Caledon and Bredasdorp, without precise locality, collected by Major H. Venter. No. 9; named in honour of the collector. Type sent to me in April, 1939 by H. Herre, Stellenbosch, and given by me to the Bot. Gard. Dahlem.—*Haw. Venteri* belongs to the § Loratae (Salm) Berger; it is near *Haw. angustifolia* Haw., but its leaves are mostly completely without teeth and have a long, simple, terminal bristle.—The innermost leaves of the plant shown in the photograph lengthened during the journey.

A New Cotyledon Species

By Karl von Poellnitz

(Oberlödla, Germany)

COTYLEDON STURMIANA von Poellnitz, sp. nov.—Suffrutescens. Folia decussata, subteretia usque semiteretia, linearia, glabra, pruinosa. Pars exterior et calycis et corollae pendulae, rubrae, basi dilatatae glandulosa. Filamenta non longiora quam corolla.

Shrubby. Stem and branches glabrous, or the youngest branches somewhat glandular. Leaves conferted, decussate, glabrous, green, pruinose, and only the youngest somewhat glandular, erect or ascending, with a small dark red mucro, terete and flattened on the face or sometimes semiterete, linear or very narrowly linear-oblong, about 7-13 cm. long, 6-9 mm. broad, 4-6 mm. thick. Peduncle terminal, terete, erect, glabrous, red-brown, up to about 15 cm. long, with a few leaves similar to the others but smaller; inflorescence corymbose-paniculate with up to about 15 pendulous, red flowers, its branches glabrous, pedicels glandular, pendulous, about 1-3 cm. long, thickened above. Flowers about $2\frac{1}{2}$ - $3\frac{1}{2}$ cm. long. Calyx glandular, tube short, lobes green with small reddish longitudinal stripes or reddish-green,

once if they fall on a suitable medium—or even a rather unsuitable one, such as pea gravel, if there is moisture present. Other members of the genus readily make plantlets along the edges of the leaves if these are laid on damp sand.

Another method of propagation is by decapitation of the parent plant. Cotyledons are apt to grow long and gawky; if the top is removed it can be treated as a cutting and re-rooted, but the base should not be thrown away as this will probably send out a number of shoots which can be removed for rooting when old enough. Senecios may be treated in the same way, and even some haworthias.

Anyone who proposes to attempt vegetative propagation should prepare a box by putting in a good layer of rough drainage such as crocks or broken brick, covering this with coarse sand to the depth of several inches, and finishing off with a layer of fine sand. If peat, or better still, sorbex is added (the mixture can be about half and half, or rather more sand than sorbex), this will be found even better than pure sand. Some plants root better in an acid soil, and an occasional watering with a very dilute (pale pink) solution of potassium permanganate is helpful. If it does no good it can do no harm, provided it is weak.

If such a box is always kept handy, any leaf which is accidentally knocked off can be put in "for luck," and any damaged plant can have the sound part removed and treated at once as a cutting. The contents of the box should be examined at reasonable intervals for, once roots are formed, the sand does not provide enough nourishment for the cuttings to grow well for long. If the cuttings look all right, there is no need to dig them up, unnecessary lifting does them no good; it is often obvious that a cutting has rooted, for the leaves take on a fresher appearance and new growth may be made; a slight pull on the stem will sometimes show if roots have been formed; but if the cutting flags or the stem ceases to look healthy, it should be dug up and inspected and, if necessary, the base cut away, the cut surface dried again and the stem put back in the sand. With leaf cuttings, the appearance of the small plantlet at the base of the leaf will indicate progress.

The best conditions for the rooting of cuttings are a close atmosphere and warmth. During the summer months most cuttings will root in a sand box stood on the staging of an ordinary greenhouse; a sheet of glass over the top helps to conserve moisture, but care must then be taken that there is no drip to cause decay. Most plants can be propagated during the late spring and summer in this simple way, but when it is a question of saving damaged plants it may be necessary to take cuttings during cold weather; it is then essential to arrange for some heat; standing the box in the warmest part of a heated greenhouse, close to the pipes if possible, is usually sufficient. Anyone who wants to propagate on a larger scale will arrange for a small cutting frame with its own heating arrangements.

When inserting cuttings it is important that they should be firm; if sufficiently rigid it is best to push the stem in for an inch or so, rather than to make a hole for it with a stick. Very succulent stems, such as *Stapelias*, should not be inserted too far; a better way with these is to tie the cutting to a stick so that the latter projects for an inch or more below the cutting; the stick can then be pushed into the sand just so far that the surface of the cutting is in contact with the soil but is not actually buried.

If a number of cuttings are being taken at the same time it is a good plan to arrange them in position and then water rather hard with a syringe which settles the sand firmly about them. Leaf cuttings should be put in at such an angle that

the base is just under the surface of the sand; to lay the leaf on the surface is not usually enough, as its curvature will probably lift the base away from the sand, and it is this portion that will produce the roots and which must, therefore, be kept moist.

A cutting box, once started, can be kept going for months, cuttings passing through it in relays, but while there are any cuttings in it, it must never be allowed to get dry.

V.H.

A New Cure for Root Mealy Bug

By A. Cuming

ONE of the most troublesome pests that attack cacti and succulents is the root mealy bug. Usually, when such an infestation is present at the roots, the plant appears to remain dormant and lifeless at a time when new growth is expected and expansion of the plant body is anticipated. In the past it has been customary to take the infected plant from the pot, remove and burn the soil, and repot in fresh, clean soil. No matter how careful one may be in this method of cleaning, it does not eradicate the pest completely.

My *Echinopsis rigidissimus* once became badly infested. It was thoroughly cleaned and repotted, yet after two months in fresh, clean soil and a fresh pot, I found it was as badly infested as ever again.

Since my troubles with this pest began, however, I have read of an excellent method of treatment with crystals of para-dichlorobenzene, which can be crushed but not too finely. If a few holes be bored into the soil in the pot with a pencil or the like, a few of the crystals inserted and the holes then filled in again, vapourisation takes place and the fumes penetrate into the surrounding soil and destroy the insurgents. The crystals are not soluble in water, so the growth of the plant is not in any way interfered with.

A few words of precaution in the use of para-dichlorobenzene are, however, necessary. The substance is poisonous, and one should wash one's hands thoroughly after use. It has a caustic action, but I have never suffered any harm by using it with bare hands. It is wise to be careful not to spill any crystals on to the plants themselves; not that any immediate harm is caused to the plant, but any crystals that are allowed to fall on to the epidermis of the plant should be removed at once.

The great advantage I find in the use of these crystals is that, even if a plant is infested in the middle of the growing season, the trouble can be eradicated, whereas to remove the plant from the pot would check growth and probably cause flower buds to fail.

The odour of the crystals may be slightly objectionable to some, but it is not very strong. I even scatter a few crystals amongst the shingle on the staging as a deterrent to stray insects. Whenever a new plant is received, I always incorporate some crystals in the coarse drainage at the bottom of the pot, and this keeps the plants immune from root bug. My entire collection of over 350 plants has been treated with these crystals, and I have not found one plant that has suffered damage

in any way from the substance. Those plants that have been infested and treated with crystals have always been cleaned thoroughly and repotted at the beginning of the following season, and I have also continued the use of the crystals; for when eradication has been achieved the crystals do not become then a destructive element to the root mealy bug, but rather a powerful deterrent and precautionary agent.

Just recently Mr. Scott E. Haselton has commented on the use of para-dichlorobenzene in his book *Cacti for the Amateur*, and it has been further commented on in the *American Cactus Journal*, so its use may not be new to some people. Further experiment is being carried out now on seedlings to see if any harmful effects are produced in the embryo stage, and it is hoped to record its value in this direction at a later date. So far, though it is early yet to say, no harm has been caused.

Para-dichlorobenzene can be obtained from chemists quite cheaply. I would certainly not be without it, for it is a joy to see my plants all growing nicely this year, whereas before I used to be discouraged by poor results which were eventually traced to the root mealy bug.

The Sheba Valley Death Tree— *Synadenium Arborescens*

THE late Mr. George Thorncroft of Barberton, Transvaal, some years ago sent me a cutting from this tree, which he described as an aged, solitary tree standing in the Sheba Valley and having under it a considerable accumulation of human and other animal bones. He said that the native interpretation of the last fact was that the animals had touched the tree and died in consequence—hence their name, “The Sheba Valley Death Tree.” Doubtless a reasonable conclusion were that sick animals sought the shelter of this solitary tree and died under it.

The cutting sent me rooted and the resulting plant thrived, yielding cuttings which were removed and given to botanic collections; one went to Australia, one was given to Mr. Williams of Chippenham. My plant died, I fear through too frequent mutilations.

Mr. Williams’s plant has flowered but has produced no seeds; I have not been able to see it and cannot say whether it is hermaphrodite, mon- or dioecious. The leaves of *Synadenium arborescens* are fleshy, rather pleasingly marked and about the size of those of the oval-leafed privet.

T. SHARP.

FIXTURES.

The Meetings are held at 6 p.m. at the Royal Horticultural Society’s
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September 12th.—Cancelled.

October 10th.—Subject to be arranged.

November 28th.—Subject to be arranged.

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PUBLISHED BY THE CACTUS AND SUCCULENT SOCIETY OF
GREAT BRITAIN AT 28 NORTHAMPTON ROAD, CROYDON

Rush & Warwick (Bedford) Ltd., Harpur Printing Works, Bedford.

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THE CACTUS JOURNAL

VOL. 8.

DECEMBER, 1939.

No. 2.

Editorial

CONDITIONS resulting from the war made it necessary for the Council to consider the future of the Cactus Society, and it is with regret that they have come to the decision that the activities of the Society must remain in abeyance whilst the war lasts.

The holding of evening meetings during the "black-out" period would not be possible; it was hoped that the *Cactus Journal* could be kept going but here again there are difficulties. Some resignations have already been received; if the membership were to fall to any considerable extent, it would not be possible to publish the Journal at its normal size, nor is the Society's reserve fund large enough to carry on for any great period. But more serious than the probable shortage of funds is the shortage of material; the members have apparently appreciated the Journal but have been content to leave the provision of the subject matter to others. In Volume VII., for instance, of the 88 pages of text, 27 only were contributed by members, a further 13 were written by the Editor, whilst 48 were supplied by persons who are not members of the Society; as the Editor cannot now get in touch with some of these non-member contributors, it is felt that it would be best to cease publication for the time being. It is hoped that the Society will be revived when times are normal again.

To our subscribers overseas, who may not be so intimately concerned in the war, we offer our apologies; outstanding subscriptions will be held over for the time being, unless the subscriber prefers to have the portion that remains returned to him.

More about Mammillarias

By A. Boarder

IN the *Cactaceae* by Britton and Rose I notice that with reference to *Neomammillaria microcarpa* (*Grahamii*) it is stated that it does not do well in cultivation and soon dies out. Now this has interested me greatly and in some respects pleased me, as I must admit that I have tried to grow this species three or four times but had no success so far. I bought an imported plant about seven years ago and was able to root it and get it growing, but not for long; after about two years it was dead. Thinking that the loss was probably due to the plant having been imported, I tried my hand with some seed. I raised several plants and thought they were doing well when they too went off. I tried again and although other seedling mammillarias thrived with the same treatment, the *Neomammillaria microcarpa* died. I have now a few more seedlings up and am hoping for the best.

It seems to me that there is something that this plant requires that I have been unable to give it so far. There is one thing I have noticed, and that is, that several other mammillarias which resemble *microcarpa* are also difficult to grow. They are all hooked and have rather pronounced tubercles. Those that readily come to mind are: *MM. dioica*, *Mainae*, *Sheldonii*, *jaliscana*, *ocamponis*, *Boedekeriana*, *Brandegeii*, *trichacantha*, *Graessneri*, *erythrosperma*, *Goodridgei*, *Olivae*, *pygmaea* and *erectohamata*. Two of these—*jaliscana* and *Olivae*—are also stated by Britton and Rose as being difficult and that the stock soon died out.

I have grown all the above from seed and flowered most of them but find that they do well for about two years and then appear to sicken. I have not found that all hooked mammillarias are so difficult, as *M. bombycina* and *Wildiana* are well-known easy growers. Although I have not had many of the above die, they certainly do not thrive and seem to require different treatment to that which I have been giving them. They mostly come from Mexico and why they should be more difficult to grow than many other mammillarias which come from the same district seems strange to me. I must admit that I do not often see many of the above-named plants of any size at shows or in dealers' collections, except for recently imported specimens.

I think that Mr. Farden has told me that he had grown *M. microcarpa* for some time without trouble, but it would be interesting to know if other members have experienced any difficulty with these plants, and I shall be very pleased to hear how they have fared with them. I have repeatedly stated that some mammillarias are very difficult to grow and I am now experimenting with various methods of growing these kinds and hope to be able to give results at a later date.

There is one thing which becomes more apparent to me each year, and that is, that some mammillarias do not appear to grow during the hottest part of our summer, say, the end of June, July and August; they then often grow well in late September and in October. This is, of course, in accordance with their habits in their natural habitat. They grow in the rainy season and rest in the hot season. We try to grow them in the summer and it is probably the fact that the plants are watered when they should be resting that causes them to go wrong. I have

certainly noticed that these plant do go off in autumn and late summer. I intend to try next season with the summer rest plan and will report the result. There does not appear to be any particular reason why these kinds do not thrive, but when we consider what a great change it is to transfer a plant from the open soil with unlimited root room to a small flower pot in a greenhouse, it does to a certain extent explain the lack of success. To keep any plant in a small pot for a number of years is really quite a feat, and I suppose that it is a wonder more plants do not succumb to the unnatural treatment.

I hope that members will not be discouraged from growing mammillarias after reading these remarks, but out of over three hundred different mammillarias I have only found a few kinds that are difficult and I am hoping to solve this problem in time. Some members tell me that if they do not succeed with a plant they do not try it again, saying that they only want plants that will grow for them. Still I feel sure that there are many members who have made repeated efforts to grow particular mammillarias and I shall be very interested to hear which ones have failed to thrive so that comparisons can be made.

Conservation of the name *Apicra*

By William T. Stearn

(*Lindley Library, Royal Horticultural Society, London.*)

THE working of the International Rules of Botanical Nomenclature has produced some surprising and troublesome results, but these rules are framed nevertheless to ensure (*a*) fixity of names, (*b*) precision in their application, and (*c*) to prevent the needless introduction of new names (see Article 14). This last aim may be defeated by too strict adherence to certain rules. Especially is this so when the rules insist on the rejection of a later homonym (i.e. a name which duplicates a previously published name based on a different type) in general use and the adoption instead of the earliest validly published non-pre-occupied name—a course which may necessitate the creation of an entirely new name. Hence the rules provide a list of generic names to be retained as exceptions (see Article 21). These names are mostly those which have come into general use during the fifty years following their publication; to reject them for less known or new names strictly in accordance with the rules would cause much inconvenience and serve no useful purpose. The list of conserved generic names forms an appendix to the rules. Additions to it must be formally proposed and then approved at an International Botanical Congress. The case for the retention of the name *Apicra* in its current sense is given below. By kind permission of the Controller of H.M. Stationery Office, it is reprinted here from pp. 329-330 of proposed additions and amendments to the rules printed in the *Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information* 1939, No. 7, pp. 317-330 (October, 1939).

(28) Generic name proposed for conservation by W. T. STEARN.

1028 (Liliac.) *Apicra* Haworth, Suppl. Pl. Succ. 61 (1819)—non *Apicra* Willdenow in Ges. Naturf. Freund. Berlin, Mag. V. 271 (1811). Suggested lectotype: *A. pentagona* (Haw.) Haw.

The name "*Apicra* Willd." has been adopted by Haworth, Suppl. Pl. Succ. 61 (1819), Baker in Journ. Linn. Soc., Bot. XVIII, 216 (1880), Bentham & Hooker, Gen. Pl. III, 776 (1883), Engler & Prantl, Nat. Pflanzenfam. II, 5, p. 46 (1887), Baker in Fl. Cap. VI, 329 (1896), A. Berger in Engler, Pflanzenreich IV, 38, III, ii (33, Liliac.-Asphodel.-Aloin.) 115 (1908), Trelease in L. H. Bailey, Stand. Cycl. Hort. I, 309 (1914), Marloth, Fl. S. Afr. IV, 87 (1915), K. Krause in Engler & Prantl, Nat. Pflanzenfam. 2nd ed., XVA, 301 (1930), Hutchinson, Fam. Fl. Pl. II, 91 (1934), Stearn in Cactus Journ. VII, 39 (1938), L. Cutak in Bull. Missouri Bot. Gard. XXVII, 114 (1939), for a South African genus of Liliaceae distinguished from *Haworthia* Duval by its regular instead of bilabiate perianth. Both genera at one time formed part of *Aloë*. *Haworthia* was separated from *Aloë* by Duval in 1809, *Apicra* by Haworth in 1819. Haworth attributed the name *Apicra* to Willdenow but, as his definition of *Apicra* indicates, and as he himself definitely stated in his Suppl. Pl. Succ. 50 (1819), Revis. Pl. Succ. 45 (1821) and Phil. Mag. n.s. II, 34 (1827), he never saw the original description of *Apicra* Willd. in Ges. Naturf. Freund. Berlin, Mag. V. (1811). This explains Haworth's misapplication of the name. Reference to Willdenow's paper shows that Willdenow separated his *Apicra* from *Aloë* on account of its irregular, bilabiate perianth. Witness his diagnosis: "Corolla monopetala . . . limbo sexpartito bilabiato, laciniis tribus superioribus, totidemque inferioribus, concavis revolutis . . . Diese Gattung ist durch den besondern Bau der Blumenkrone von den eigentlichen *Aloë* Arten beim ersten Blick zu unterscheiden" (Willdenow, 1811). That is the very character by which Duval in 1809 had defined his *Haworthia*: "Calyx petaloideus, rectus, superne revolutus in duo labia" (Duval, 1809). Moreover, Duval's nine species of *Haworthia* are among twenty-eight species included by Willdenow in his *Apicra*. Thus, as A. J. A. Uitewaal has pointed out in Cactussen en Vetplanten, II, 90 (1936), *Apicra* Willd. (1811) is a synonym of *Haworthia* Duval (1809). In defining *Apicra* as a genus with a regular perianth unlike *Haworthia*, Haworth was really founding a new genus. For this genus, which comprises about 12 species and is well known to South African botanists and to growers of succulent plants both in Europe and America, the name *Apicra* has been in continuous use since 1880. No alternative name exists. *Apicra* Haw. is accordingly here proposed for conservation.

On account probably of a general resemblance in vegetative growth to his twenty-two species with irregular perianth, Willdenow erroneously included *Aloë pentagona* Haw. (together with five other then little-known species now referred to *Apicra* Haw., their perianth being regular) in the genus *Apicra* Willd. This species, which is well figured in Bot. Mag. t.1338 (1810) and Salm-Dyck, Mon. Gen. Aloës, § 1 t.4 (1837), has, however, a regular perianth. When placed under *Apicra* Haw. it is cited as *Apicra pentagona* (Haw.) Haw. because (1) the generic name *Apicra* Willd. is here proposed for rejection and cannot be adopted in a specific combination, (2) the species does not belong to the genus *Apicra* Willd. as defined by Willdenow. The name *Apicra pentagona* (Haw.) Haw. (1819) can be used for this species since it is not a later homonym of *A. pentagona* (Haw.) Willd. (1811), both being based on the same type, *Aloë pentagona* Haw. (1804).

“Rare” Cacti—VI

By G. Turner

SEVERAL readers of these notes have written such charming letters, all containing requests for more, that one feels obliged to comply. It is a great pleasure to find new and interesting friends, and to realise that there are so many keen collectors dotted about all over the country. Continuation is only possible when new material becomes available, because it was decided that only specimens under observation should be described.

The descriptions of many species published by Britton and Rose in the *Cactaceae* were based upon dried portions of plants and flowers sent to them by the earlier collectors and not actual surveys of living specimens. Many of these still remain to be discovered. There is no reason to doubt their existence, it is simply a matter of exploration and £ s. d. The future outlook is brighter than it was a decade ago. Motor transport and state educational facilities combine in assisting the botanical collector in the field to meet with a greater measure of success.

I sometimes feel that many cactophiles do not actually realise what an arduous undertaking cactus collecting in their native habitats can be. Perhaps a synopsis from a letter received from one universally known will provide an example. This collector holds a University Degree of B.Sc. in Botany, speaks and writes five languages and is a well-known author. With a companion, he went to explore almost unknown deserts in Central Mexico, seeking *Cereus Beneckii* and other varieties. They encountered almost impassable roads, torrid heat, storms; sometimes they travelled less than one mile per day, having to dig a way for their wagon to follow. Other days they came up against giant stone boulders which had to be negotiated. They got lost, ran short of water, and for two days had no food. Finally, abandoning everything, they crawled exhausted into a native village where they were welcomed. He sums up by: “We returned *sans burra, sans cacti, sans clothes, sans everything—penniless.*” A few days later he secured a job peddling ice cream and soon became a great favourite with the Japanese, Chinese and Spanish-American children, because he could talk to them. And that was the end of his expedition in which he had invested all his savings. He now rents a room on top of a high building and has half a dozen cacti growing in a window box, because he says he could not live without them.

When war began, cacti suffered the first blow. They were placed No. 1 on the list of prohibitions; licences are now required for the importation of goods from neutral countries. The responsible government department for issuing this order was so determined to prevent such a formidably armed desert tribe from invading our shores, that special precautions were deemed necessary under D.O.R.A., and the No. 1 was qualified with a distinguishing asterisk. When the intelligentsia are suddenly confronted by one of those—no matter how temperamentally cool and collected the individual may be—a physical reaction develops of the “hot and bothered” variety and continues until one finds an explanation in the appendix. In this instance it denotes that the utmost rigour of the law will be imposed. “No licence will be issued.”

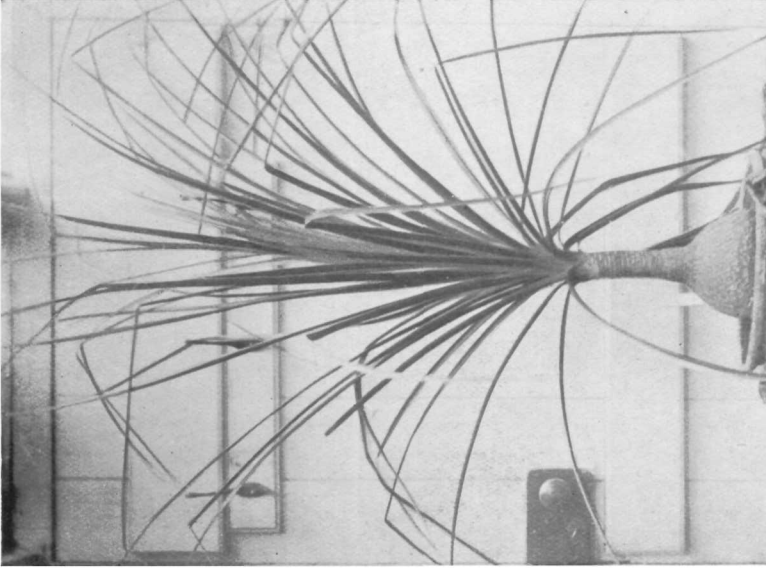
It so happened that an expedition in which the writer is highly interested returned from the wilds ten days after war commenced. The "finds" include half a dozen of the rarest specimens discovered in recent years. Judge of the chagrin the distinguishing asterisk caused. Is it an insuperable barrier or merely "red tape"? The ensuing correspondence with one department after another would fill these pages. Up to date no ultimatum has arrived. The latest news says: "The matter is receiving deep consideration." The moral is—collectors never say die.

For many years the writer held a divergent opinion concerning cristates, at times ignoring their very existence and refusing to be told anything about them. Text-books were largely responsible for that outlook, until a learned and eminent botanical research worker took a hand at disillusionment, and now, if those years could be retracted, a certain collection would contain cristates only, because they are natural plants, and good specimens exceedingly rare. Those who have made a profound study of crested cacti most emphatically disagree with the old theory that they are monstrosities or unnatural growth, or the young seedling plant sustained injury in its embryo stage of development or a bird pecked the growing tip and so injured the extreme cells that they sprouted into divers shapes, and many equally ambiguous fallacies. Theories such as these have been exploded; they have all been tried and found wanting.

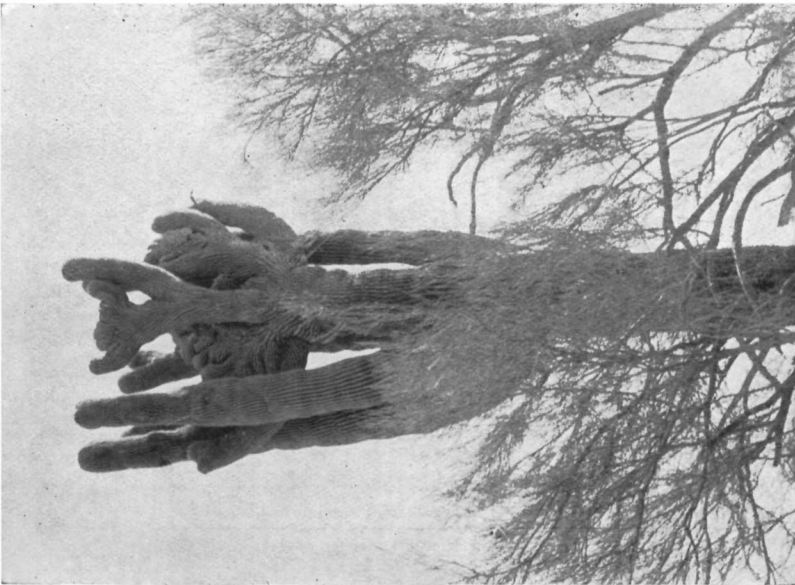
A scientifically minded member of our Society has collaborated in this particular study of crests. Scores of examples have been cut and sliced in all ways and examined under a high-power microscope to find the theoretical breakdown of cells or skin causing the supposed distortion, without finding a trace of them. The growing tips of seedlings, young plants and mature specimens have been pricked with a needle and growing tips cut with a knife in many ways to divide the growing point. They have either healed up and continued normal growth, or growth had stopped and side shoots developed, or the plant has succumbed. No cristate has ever resulted. Neither has anyone ever authenticated the production of a crest from a natural plant.

If cristates are the production of unnatural cultivation, why do they not frequently occur in our own collections—especially the larger collections like Kew, Dahlem or La Mortola, where accommodation is available for mature specimens of large proportions or dimensions? No one can agree we grow them naturally—in pots, under glass, with artificial heat, some succeeding in cultivating them on a starvation diet, others apparently successfully in compost rich in humus. In fact, no two collectors grow them under identical conditions. When it is remembered that they are natives of arid deserts and plains where they enjoy real sunshine and temperatures unknown in these latitudes, it entirely displaces this theory. Because no one has ever heard or read of a satisfactory statement as to how crests are brought about and because ancient text-books have described them as monsters it has inveigled those who view cristates from their own preconceived outlook into finding that the plants are not what they should be. Therefore plants and nature are wrong, too terrible to contemplate.

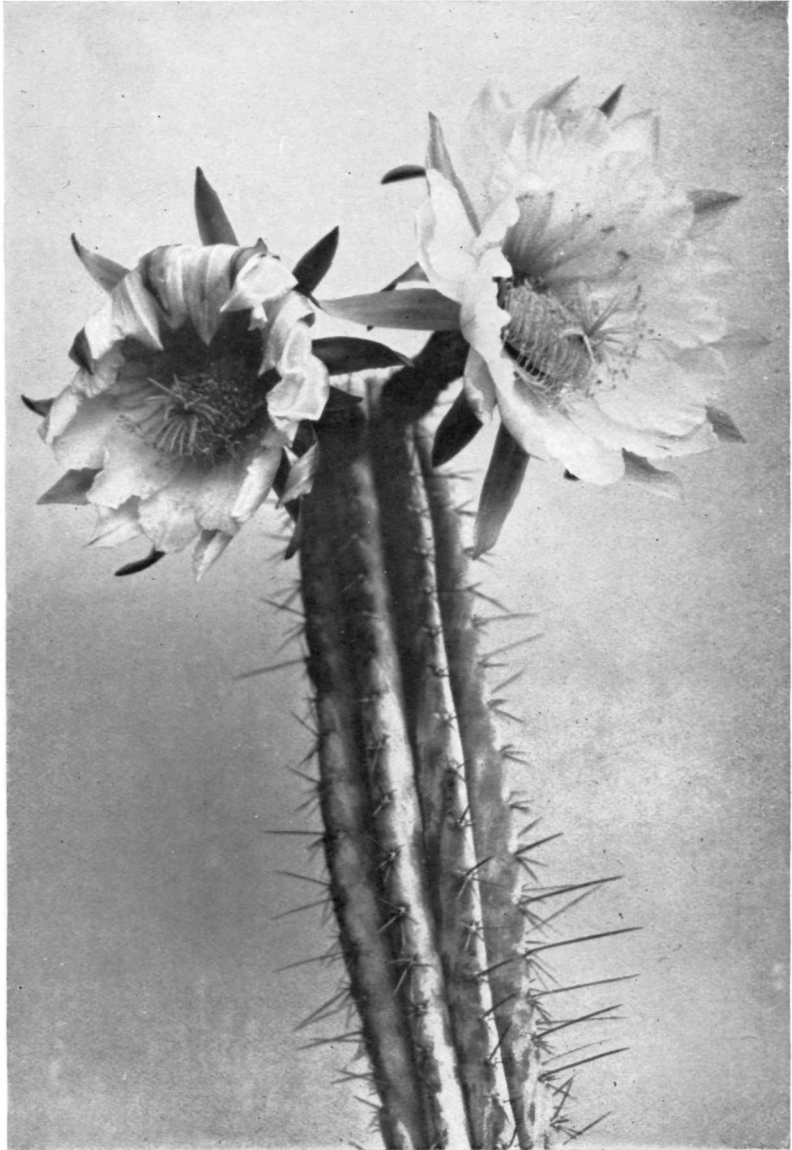
Nature decides that certain plants (the genus *Cereus* especially) when they become mature shall be crowned with a crest. Nothing has interfered with the plant, it has had its wet and dry periods and is simply fulfilling the laws of nature in showing its adornment by cresting; all plants of the same family and the same size do not do so, but this does not mean that they cannot do it. Probably they would,



Nolina recurvata.



Carnegiea gigantea cristata.



Cereus macrogonus

A. Bailey.

under different conditions. A crest is the natural final growth of a natural mature plant. Some families produce crests abundantly; a few, seldom; others, never. It therefore follows that there are rare and desirable cristates.

If cristates were formed unnaturally by the theories advanced, it is conceivable that they should occur plentifully with prolific species or genera found over very wide distributions, i.e. the *Opuntia* tribe. My old friend, Prof. Leon, has made a special study of all the West Indian species over a period of forty years and has never seen an *Opuntia Dillenii cristata*. *Opuntia Silvestrii* seldom forms crests; when it does, they are the most beautiful plants imaginable. *Opuntia ursinii*, one of the species coveted by collectors, is another example. On the other hand, there is no record of anyone having seen a crested *Ferocactus*.

In conclusion, my friend recently found a *Cereus gigantea cristata* (p. 31—another rarity. The plant is approximately sixty feet high and its weight estimated at four tons. It is now being collected and transported to his garden. If it were a monstrosity he certainly would not incur all that trouble and expense. All these misplaced theories obtain through the failure to recognise the great gulf separating cristation from fasciation. The latter state of metamorphosis has been considered analogous; whereas cristation is a natural and integral part of normal growth, fasciation is the direct opposite.

Cereus Macrogonus in Flower

Mr. Sharp gave me a large cutting of *Cereus macrogonus* about five years ago; after it had rooted and grown well I cut off about a foot of it so as to have a second plant and this I gave to another member with whom it has grown well. But since I cut that piece off about two years ago, my plant has grown nearly three feet more and in August of this year it produced three lovely blooms, each measuring eight inches across; the third bud does not show in the picture (p. 32). The plant is now six feet high and about 4 inches in diameter. In the December number of the Journal, 1937, there is an account of Mr. Sharp's plant which he had grown for twenty-four years and only had one bloom on a spindly plant 6½ inches across. From the account given by Mr. Sharp and from what Mr. Cobbold says in his catalogue of the Darrah collection, it is rare for cultivated plants of this *cereus* to flower. I should like to know what has been the experience of other members.

A. BAILEY.

Nolina Recurvata

Nolina recurvata, from south-western North America, family-Liliaceae, is notable for its highly developed storage organ. In infancy the leaves are gracefully recurved for three-fourths of their length, in age only they straighten and become xerophytic. It is easy of cultivation in porous compost in greenhouse conditions.

The circumference of the base of the stem of the plant shown in the photograph (p. 31) is 22 inches. Very fine specimens may be seen in botanical collections.

T. SHARP.

Haworthia attenuata (Haw.) and its varieties

By Richard S. Farden

IN the *Cactus Journal*, Vol. 6, No. 4, June, 1939, I published a series of the varieties of *Haworthia attenuata* Haw. Dr. von Poellnitz wrote me and said that it could not be accepted by botanists in that form, that of being designated by letters, and would I repeat it in proper form, so I have done so and, in the interim, through searching in all sources, in Europe and S. Africa, I have got together others as well, as specified below. It is not easy to define these varieties because nearly all of the varieties are irregular in the disposition of the tubercles, it is therefore necessary to avoid defining the leaves by extremes and only to select those which may be called the most general. A persistent characteristic of the species is the medial row of tubercles down the face of the leaves. To economise space I have been obliged to draw the shape of the leaves more or less all alike, though retaining the exact disposition and size of the tubercles. It has now been recognised that the tubercles of the back are more important than those of the face, so they are now put first. All the varieties are from plants from S. Africa and not from garden hybrids.

DESCRIPTIONS OF VARIETIES.

SECTION I.—*Zebratae*, Farden (Banded).

No. 1.—*Haworthia attenuata* (Haw.) var. *caespitosa* (Berger) Farden (= *H. fasciata* (Willd.) Haw. var. *caespitosa* Berger), I have removed this variety from *fasciata* to *attenuata* where it should belong.

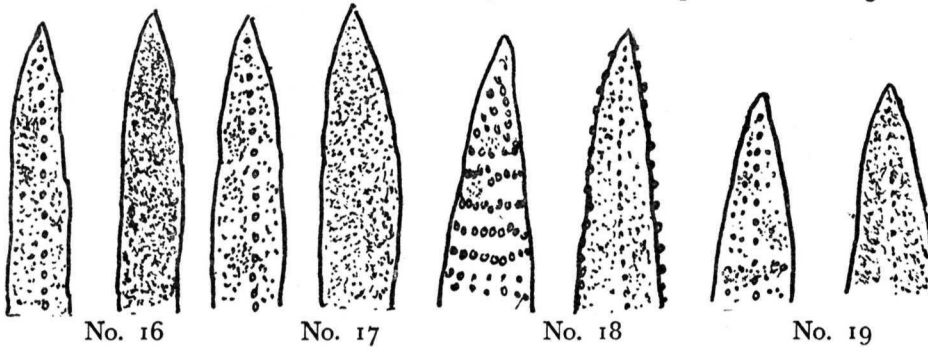
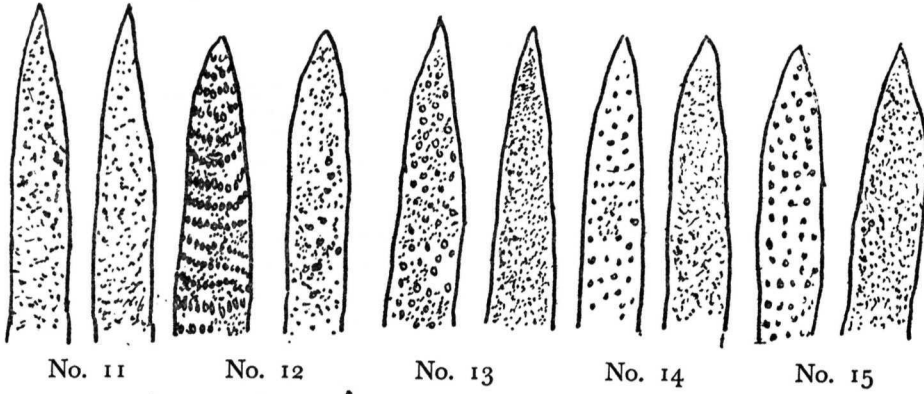
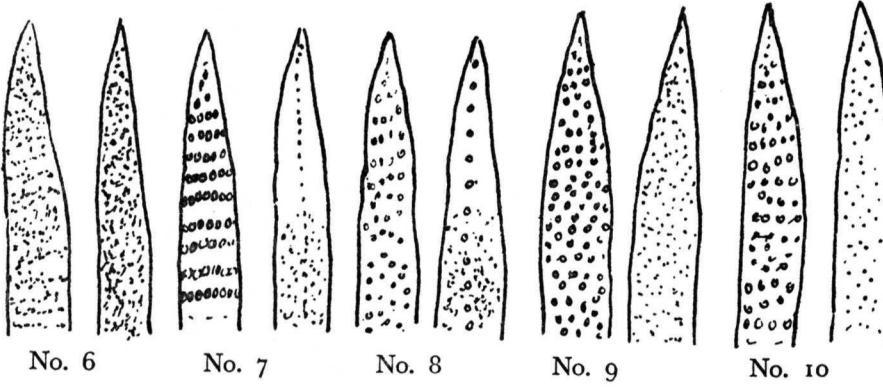
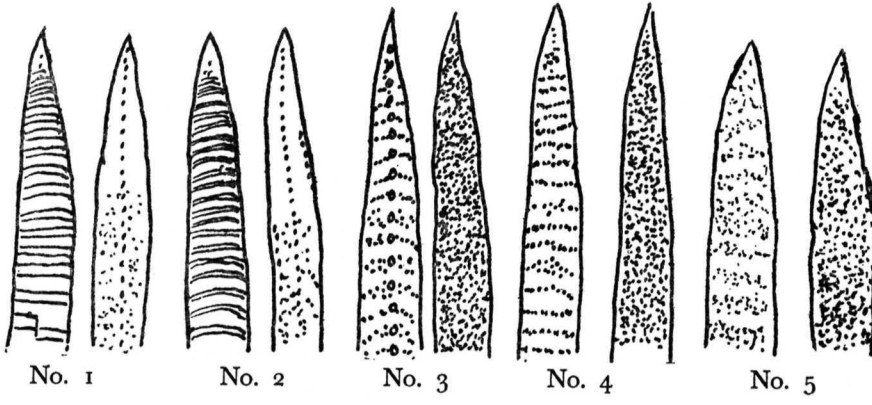
Folia 6-7 cm. longa, 17-18 mm. lata, subtus lineis albis 1 mm. latis, 4 mm. distantibus; supra in parte inferiore et secus lineam mediam tuberculis albidus vel concoloribus munita.

Stem 4 cm. tall, leaves 6-7 cm. long, 17-18 mm. wide, flat, turns to purple green. *Back* of leaf has white bands 1 mm. broad and 4 mm. apart. In several leaves there are flaws, isolated tubercles are very rare. *Face* of the leaf has a medial row of tubercles and a few tubercles confined to the lower half, whitish or concolorous.

No. 2.—*H. attenuata* var. *O'Donoghueana* Farden.

Folia 3-4 cm. longa, 14 mm. lata, laete viridia, subtus lineis tenuibus regularibus 2 mm. distantibus, supra tuberculis plerumque albidus munita.

Leaves 3-4 cm. long, 14 mm. wide, flat, bright green. *Back* has very fine bands 2 mm. apart, very regular, no isolated tubercles. *Face*, medial row of whitish tubercles and other concolorous ones confined to lower half.



In each case, the left-hand leaf of the pair shows the back,
the right-hand is the face.

No. 3.—*H. attenuata* var. *Uitewaaliana* Farden.

Leaves 3-4 cm. long, 2 cm. wide, bright green. *Back*, tubercles in rows, small, white, close, rows 2 mm. apart, down the keel line tubercles unusually prominent. *Face*, medial row inconspicuous; tubercles very fine, white or whitish, close and covering the leaf.

No. 4.—*H. attenuata* var. *argyrostigma typica* (Baker) Berger.

Caulescent species, 15 cm. tall, 9 cm. in diameter; leaves erecto-patent, 3 cm. long, 1.5 cm. wide, acuminate, face concave. *Back*, tubercles fine, somewhat irregularly distributed, white, cross rows on some of the leaves only, 1.5 mm. apart, never confluent. *Face* covered with fine concolorous tubercles, with medial line down some leaves only.

No. 5.—*H. attenuata* var. *argyrostigma* (Bak.) forma *a* Farden.

Caulescent, leaves 3.5 cm. long, 15-17 mm. wide. *Back*, tubercles finer and closer than in *typica* and rows less defined. *Face*, tubercles concolorous and spread all over.

No. 6.—*H. attenuata* var. *argyrostigma* forma *β* Farden.

Leaves 3-4 cm. long, 12-14 mm. wide. *Back*, tubercles fine as in forma *a*, semi-concolorous, more irregular and with very few cross rows. *Face* covered with fine concolorous tubercles.

SECTION II.—*Unimensurae*, Farden (Tubercles all one size).

No. 7.—*H. attenuata typica* Haw.

Leaves 30-40, lanceolate-deltoid, acuminate, 6-7.5 cm. long, 1.5 cm. wide, bright dark green. *Back* with white tubercles, middle sized, most leaves have cross rows of confluent tubercles, but towards the apex they become quite separate. *Face*, medial row of white tubercles well defined, other tubercles confined to the lower half.

No. 8.—*H. attenuata* var. *linearis* Farden.

Folia 6 cm. longa, 8 mm. lata, subtus tuberculis parvis irregulariter dispositis. supra tuberculis parvis in parte inferiore tecta.

Leaves 6 cm. long and 8 mm. wide at the base and 5 mm. only in the middle. *Back*, tubercles white, fine, very loosely and irregularly distributed, hardly any signs of cross rows. *Face*, in medial row the tubercles are 4 mm. apart, other tubercles are close over the lower part of the leaf, though on some leaves they go nearly to the apex.

No. 9.—*H. attenuata* var. *deltoides typica* Farden.

Folia 3-3.5 cm. longa, 12-13 mm. lata, subtus tuberculis mediocribus irregulariter sed crebre dispositis, supra tuberculis parvis plerumque concoloribus tecta.

Leaves 3-3.5 cm. long, 12-13 mm. wide at base, flat. *Back*, tubercles medium

sized, irregularly distributed, rather close, hardly any suggestion of cross-rows. *Face*, medial row shown up by the tubercles being whiter than those around, fine fairly well distributed, some whitish and many concolorous.

No. 10.—*H. attenuata* var. *deltoidea* forma α Farden.

Leaves 3.5 cm. long and 14-15 mm. wide, flat. *Back*, tubercles medium sized, white, irregularly distributed, in some places inclining to cross rows. *Face*, medial row indistinct, tubercles fine, loosely distributed, some whitish but most concolorous.

No. 11.—*H. attenuata* var. *minissima* Farden.

Folia 4.5 cm. longa, 10-12 mm. lata, acuminata, subtus tuberculis albis minutis tecta, supra linea mediana definita et tuberculis minutis in parte inferiore concoloribus in parte superiore albidus tecta.

Leaves 4.5 cm. long, 10-12 mm. wide at base, very acuminate, concave, very black-green. *Back*, tubercles white, very fine and covering the whole surface; pronounced row down the keel. *Face*, medial row defined, tubercles very fine and slightly finer than those of the back.

SECTION III.—*Bimensurae*, Farden (Tubercles of two sizes).

No. 12.—*H. attenuata* var. *Britteniana* v.P.

Leaves 6-7 cm. long, 1.5 cm. wide. *Back*, the tubercles in two sizes, irregular in shape and indented at the apex, medium sized and very fine; the medium sized ones are mostly in irregular loose cross rows, the very fine ones in small groups. *Face*, medial row poorly defined, face loosely covered with fine whitish, roundish or transversely oblong tubercles and amongst them groups of very fine ones also, as on the back.

No. 13.—*H. attenuata* var. *Britteniana* v.P. forma α Farden.

Leaves 6-7 cm. long, 2 cm. wide, more concave than in *typica*. *Back*, tubercles medium sized, distribution very mixed, some irregular rows and some leaves entirely irregular, also fine tubercles in groups and lines. *Face*, indistinct medial row, tubercles fine, whitish, fairly well distributed over the whole surface, small, fine and close.

No. 14.—*H. attenuata* var. *Britteniana* v.P. forma β Farden.

Leaves 5-6 cm. long, 1 cm. wide, flat, very acuminate. *Back*, tubercles smaller, loosely and irregularly disposed, hardly any signs of cross rows and very few fine ones. *Face*, pronounced medial row, tubercles fine, close, almost concolorous.

No. 15. *H. attenuata* var. *Britteniana* v.P. forma γ Farden.

Leaves 5-6 cm. long, 1 cm. wide, flat, very acuminate. *Back*, tubercles same as in forma β but there are no fine ones at all. *Face*, tubercles same as forma β but whiter.

No. 16.—*H. attenuata* var. *Britteniana* v.P. forma δ Farden.

Leaves 5-6 cm long, 1.5 cm. wide, flat, lanceolate-deltoid. *Back*, tubercles small, irregularly distributed, both the small and the fine ones nearly the same size; keel line well defined with a row of tubercles 2 mm. apart. *Face*, tubercles very fine, medial row only just defined, all tubercles quite concolorous.

No. 17.—*H. attenuata* var. *Britteniana* v.P. forma ϵ .

Leaves 5-6 cm. long, 1.5 cm. wide at the base, flat. *Back*, tubercles small, white, close, interspersed with very fine ones; keel row of tubercles 2 mm. apart on 50 per cent. of the leaves. *Face*, tubercles very fine and very close and quite concolorous.

No. 18.—*H. attenuata* var. *clariperla* Haw. (Phil. Mag. 1826, 186).

Leaves 6 cm. long, 1.5 cm. wide, flat. *Back*, tubercles very white and prominently raised, medium sized, irregularly disposed, with some leaves showing cross rows, very few fine ones. *Face*, defined medial row on some leaves only, tubercles white, fine, very close and with still finer ones amongst them.

No. 19.—*H. attenuata* var. *inuitata* Farden.

Folia 3.5 cm, long, 15 mm. wide, flat. *Back*, tubercles very irregularly disposed, some leaves showing cross rows, small, white, interspersed with very fine ones; all leaves show a row of tubercles along the keel line 2 mm. apart. *Face* with medial row, all tubercles very fine and covering the entire surface and quite concolorous.

Haworthia longifolia

Haworthia longifolia v.P., sp. nov.—As originally received, many plants of *Haworthia longifolia* were marked with white tubercles, and Dr. von Poellnitz classified the species in Section *Margaritiferae*. It now appears that most specimens have either concolorous tubercles or wavy markings, or else merely a rugose skin, and Dr. von Poellnitz desires it to be known that he has now transferred this species to Section *Scabrae* where it appears to be more happily at home.

R. S. FARDEN.

Pfeiffer and Otto's "Abbildung und Beschreibung Blühender Cacteen"

By William T. Stearn

(Lindley Library, Royal Horticultural Society, London.)

THE *Abbildung und Beschreibung blühender Cacteen. Figures des Cactees en Fleur* * * * *avec un Texte descriptif* (2 volumes, folio) is a bilingual work, with fine coloured figures of cacti in flower. The first volume is by Louis G. C. Pfeiffer (1805-1877) and C. Friedrich Otto (1783-1856), the second by Pfeiffer alone. It was published in parts between 1838 and 1850 at Kassel (Cassel). The title-page of Vol. 1 is dated "1843," of Vol. 2 "1846-50," but no details are given of the dates of publication of individual plates. These are accordingly supplied below, the names adopted by Pfeiffer and Otto being followed by those adopted in *The Cactaceae* (Vol. 1, 1919; 2, 1920; 3, 1922; 4, 1923) by Nathaniel Lord Britton (1859-1934) and Joseph Nelson Rose (1862-1928) together with references to this, the standard work on the family. Britton and Rose used the now abandoned American Code of botanical nomenclature instead of the International Rules. They were ardent splitters of genera and recognised 124 genera of cacti, whereas the more conservative Friedrich Vaupel (1876-1927), surveying the family in 1925, accepted only 22 of these. Hence the Britton and Rose nomenclature is likely to undergo much alteration when the family is again revised as a whole. But of that there is no immediate prospect. On account of its wealth of illustrations, its wide scope, its keys, descriptions and references to previous literature, Britton and Rose's work will remain for a long period the most useful work on the family, and that, rather than agreement with its authors' taxonomic principles, has undoubtedly led to the present wide adoption of their system and its frequently strange-looking names. Hence the citation of these below.

VOLUME I.

Part 1 publ. 1838, rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1838* p. 162, *Flora* 22. I. 16 (Jan. 1839), Loudon, *Gard. Mag.* 15. 522 (Sept. 1839).

- Plate 1. *Echinocactus Sellowianus* Link & Otto [= *Malacocarpus tephraanthus* (Link & Otto) K. Schumann; Br. & R. 3. 188].
,, 2. *Echinocactus centeterius* Lehmann [= *Malacocarpus mammillarioides* (Hooker) Br. & R. 3. 203].
,, 3. *Mammillaria bicolor* Lehmann [= *M. geminispina* Haworth, syn. *Neomammillaria geminispina* (Haworth) Br. & R. 4. 98].
,, 4. *Echinopsis multiplex* (Pfeiffer) Zuccarini; Br. & R. 3. 64.
,, 5. *Cereus Hookeri* Link & Otto [= *Epiphyllum Hookeri* (Link & Otto) Haworth; Br. & R. 4. 197].

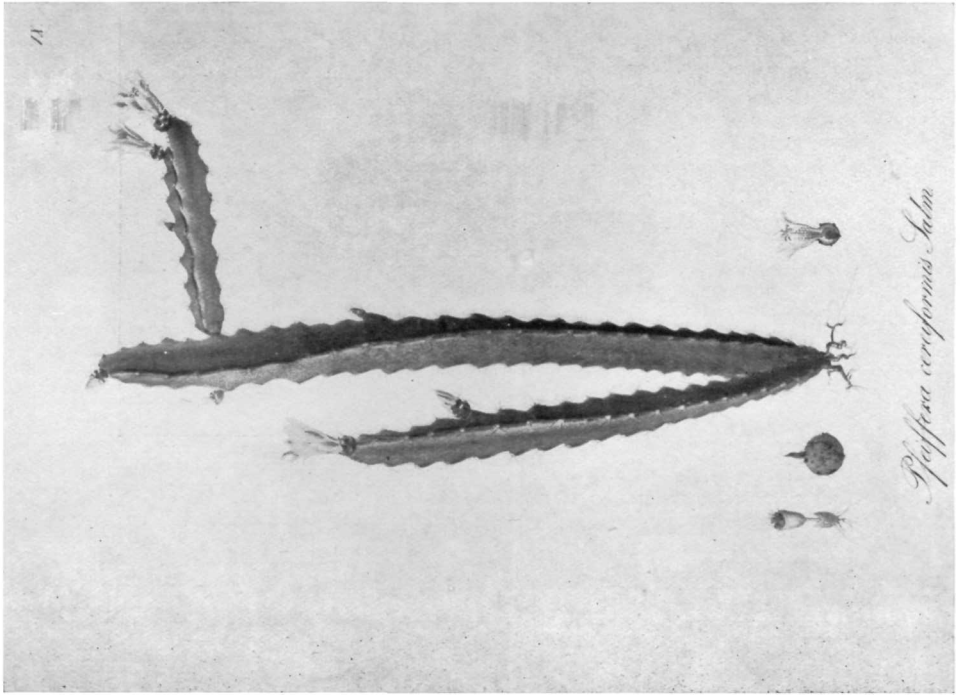
Part 2 publ. 1839, rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1839* p. 171, Hooker, *Journ. Bot.* 2. 436 (Sept. 1840).

- ,, 6. (1.) *Opuntia Salmiana* Parmentier; Br. & R. 1. 73.

- „ 6. (2.) *Opuntia curassavica* (Linné) Miller [incorrectly named=*O. repens* Bello; Br. & R. **1.** 103].
- „ 7. *Mammillaria cirrhifera* Martius [=*M. compressa* De Candolle, syn. *Neomammillaria compressa* (De Candolle) Br. & R. **4.** 90].
- „ 8. *Mammillaria Seitziana* Martius [syn. *Neomammillaria Seitziana* (Martius) Br. & R. **3.** 83].
- „ 9. *Echinocactus phyllacanthus* Martius [=*Echinofossulocactus phyllacanthus* (Martius) Lawrence; Br. & R. **3.** 118].
- „ 10. (1.) *Cereus Phyllanthus* (Linné) De Candolle [=*Epiphyllum Phyllanthus* (Linné) Haworth; Br. & R. **4.** 187].
- „ 10. (2.) *Cereus latifrons* Zuccarini [=*Epiphyllum oxypetalum* (De Candolle) Haworth; Br. & R. **4.** 188].
- Part **3** publ. **1839** rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1839* p. 171, Hooker, *Journ. Bot.* **3.** 436 (Sept. 1840).
- „ 11. *Cereus Curtisi* Link & Otto [=*Cephalocereus nobilis* (Haworth) Br. & R. **2.** 44].
- „ 12. *Cereus flagriformis* Zuccarini [=*Aporocactus flagriformis* (Zuccarini) Lemaire; Br. & R. **2.** 219].
- „ 13. *Mammillaria uberiformis* Zuccarini [=*Dolichothele uberiformis* (Zuccarini) Br. & R. **4.** 63].
- „ 14. *Echinocactus leucacanthus* Zuccarini [=*Thelocactus leucacanthus* (Zuccarini) Br. & R. **4.** 8].
- „ 15. *Cereus coccineus* Salm-Dyck (1837) non De Candolle (1828) [=*Heliocereus coccineus* Br. & R. (1909) syn. *H. elegantissimus* Br. & R. (1920) **2.** 127].
- Part **4** publ. **1840** rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1840* p. 180.
- „ 16. *Cereus setaceus* Salm-Dyck [=*Mediocactus coccineus* (Salm-Dyck) Br. & R. **2.** 211].
- „ 17. (1.) *Rhipsalis pentaptera* Pfeiffer; Br. & R. **4.** 236.
- „ 17. (2.) *Rhipsalis platycarpa* (Zuccarini) Pfeiffer; Br. & R. **4.** 242.
- „ 18. *Opuntia foliosa* (Willdenow) Salm-Dyck [=*O. pusilla* (Haworth) Haworth; Br. & R. **1.** 105].
- „ 19. *Mammillaria uncinata* Zuccarini [syn. *Neomammillaria uncinata* (Zuccarini) Br. & R. **4.** 140].
- „ 20. *Echinocactus acutissimus* Link & Otto [=*Neoporteria subgibbosa* (Haworth) Br. & R. **3.** 97].
- Part **5** publ. **1842** rev. in Hinrichs, *Verz. Büch. Jan-Juni 1842* p. 178, Loudon, *Gard. Mag.* **19.** 79 (Feb. 1843).
- „ 21. *Echinocactus hybocentrus* Lehmann [=*Malacocarpus mammillarioides* (Hooker) Lehmann; Br. & R. **3.** 188].
- „ 22. *Cereus eriophorus* Link & Otto ex Pfeiffer [=*Harrisia eriophora* (Pfeiffer) Br. & R. **2.** 149].
- „ 23. *Cereus undatus* Link & Otto ex Pfeiffer [=*Harrisia gracilis* (Miller) Br. & R. **2.** 151].
- „ 24. *Opuntia coccinellifera* (Linné) Miller [=*Nopalea cochenillifera* (Linné) Salm-Dyck; Br. & R. **1.** 34].
- „ 25. *Mammillaria eriacantha* Link & Otto [syn. *Neomammillaria eriacantha* (Link & Otto) Br. & R. **4.** 127].

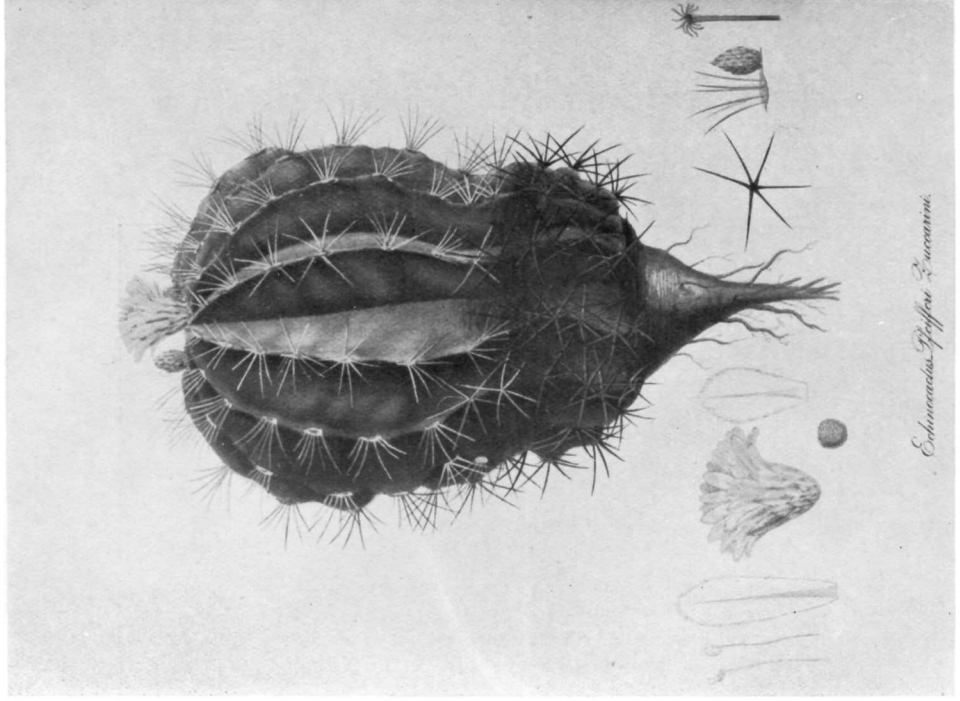


Frontispiece of *Dr. Ludwig Pfeiffer's Malakozologische Blätter für 1898.*



Pfeiffera ianthothele (Monville) Weber.

(Reproduced from Pfeiffer & Otto's *Abbildung und Beschreibung blühender Cacteen.*)



Ferocactus glaucescens (D.C.) Br. & R.

(Reproduced from Pfeiffer & Otto's *Abbildung und Beschreibung blühender Cacteen.*)

- Part 6 publ. 1843 rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1843* p. 161, *Bot. Zeitung* 2. 126 (Feb. 1844).
- „ 26. *Mammillaria pycnacantha* Martius [=Coryphantha pycnacantha (Martius) Lemaire; Br. & R. 4. 41].
- „ 27. *Cereus Schrankii* Zuccarini [=Heliocereus Schrankii (Zuccarini) Br. & R. 2. 127].
- „ 28. *Epiphyllum Altensteinii* Pfeiffer [=Zygocactus truncatus (Haworth) K. Schumann; Br. & R. 4. 177].
- „ 29. *Opuntia brasiliensis* (Willdenow) Haworth, Br. & R. 1. 209.
- „ 30. *Pereskia Bleo* (Humboldt, Bonpland & Kunth) De Candolle [incorrectly named=P. grandifolia Haworth; Br. & R. 1. 9].

VOLUME II.

- Part 1 publ. 1845 rev. in *Bot. Zeitung* 3. 9365 (May, 1845), Hinrichs, *Verz. Büch. Jan-Juni. 1845* p. 197.
- „ 1. *Discocactus insignis* Pfeiffer [=D. placentiformis (Lehmann) K. Schumann; Br. & R. 3. 219].
- „ 2. *Echinocactus Pfeifferi* Zuccarini [=Ferocactus glaucescens (De Candolle) Br. & R. 3. 137].
- „ 3. *Echinocactus turbiniformis* Pfeiffer [=Strombocactus disciformis (De Candolle) Br. & R. 3. 106].
- „ 4. *Echinopsis oxygona* (Link) Zuccarini; Br. & R. 3. 64.
- „ 5. *Cereus peruvianus* Tabernaemontanus [=C. peruvianus (Linné) Miller; Br. & R. 2. 11].
- Part 2 publ. 1846 rev. in Hinrichs, *Verz. Büch. Juli-Dec. 1846* p. 175.
- „ 6. *Echinocactus tetraanthus* Lemaire [=Malacocarpus tephraanthus (Link & Otto) K. Schumann; Br. & R. 3. 188].
- „ 7. *Echinopsis turbinata* Zuccarini; Br. & R. 3. 66.
- „ 8. *Mammillaria zephyranthoides* Scheidweiler [syn. Neomammillaria zephyranthoides (Scheidweiler) Br. & R. 4. 159].
- „ 9. *Pfeiffera cereiformis* Salm-Dyck [=P. ianthothele (Monville) Weber; Br. & R. 4. 210].
- „ 10. *Echinopsis pectinata* (Scheidweiler) Fennel [=Echinocereus pectinatus (Scheidweiler) Engelman; Br. & R. 3. 29].
- Part 3 publ. 1847 rev. in *Bot. Zeitung* 5. 372 (May, 1847), Hinrichs, *Verz. Büch. Jan-Juni. 1847* p. 155.
- „ 11. *Echinocactus concinnus* Lemaire [=Malacocarpus concinnus (Monville) Br. & R. 3. 192].
- „ 12. *Gymnocalycium reductum* (Link) Pfeiffer [=G. gibbosum (Haworth) Pfeiffer; Br. & R. 3. 158].
- „ 13. *Echinocactus fossulatus* Scheidweiler [=Thelocactus fossulatus (Scheidweiler) Br. & R. 4. 10].
- „ 14. *Echinocactus Bridgesii* Pfeiffer [=Copiapoa echinoides (Lemaire) Br. & R. 3. 88].
- „ 15. *Cereus variabilis* Pfeiffer; Br. & R. 2. 13.
- Part 4 publ. 1848 rev. in *Bot. Zeitung* 6. 159 (Feb. 1848)
- „ 16. *Echinocactus longihamatus* Galeotti [=Ferocactus hamatacanthus (Mühlenpfordt) Br. & R. 3. 144].

- „ 17. *Phyllocactus phyllanthoides* (De Candolle) Link [=Nopalxochia phyllanthoides (De Candolle) Br. & R. 4. 205].
- „ 18. *Echinocactus uncinatus* Galeotti [=Feroactus uncinatus (Galeotti) Br. & R. 3. 146].
- „ 19. *Echinocactus coptogonus* Lemaire [=Echinofossulocactus coptogonus (Lemaire) Lawrence; Br. & R. 3. 110].
- „ 20. *Mammillaria elephantidens* Lemaire [=Coryphantha elephantidens (Lemaire) Lemaire; Br. & R. 4. 32].
- Part 5 publ. 1848 rev. in *Bot. Zeitung* 6. 438 (June, 1848), Hinrichs, *Verz. Büch. Jan-Juni 1848* p. 182.
- „ 21. *Echinocactus Williamsii* Lemaire [=Lophophora Williamsii (Lemaire) Coulter; Br. & R. 3. 84].
- „ 22. *Echinocactus obvallatus* De Candolle [incorrectly named=Echinofossulocactus lancifer (Dietrich) Br. & R. 3. 118].
- „ 23. *Mammillaria nigricans* Fennel [=Mammillaria phaeacantha Lemaire, syn. Neomammillaria phaeacantha (Lemaire) Br. & R. 4. 116].
- „ 24. *Cereus coerulescens* Salm-Dyck [=C. aethiops Haworth; Br. & R. 2. 17].
- „ 25. *Echinocactus bicolor* Galeotti [=Thelocactus bicolor (Galeotti) Br. & R. 4. 11].
- Part 6 publ. 1850 rev. in *Bot. Zeitung* 8. 329 (April, 1850), Hinrichs, *Verz. Büch. Jan-Juni 1850* p. 169.
- „ 26. *Mammillaria conoidea* De Candolle [=Neolloydia conoidea (De Candolle) Br. & R. 3. 17].
- „ 27. *Echinocactus arrigens* Link [=Echinofossulocactus arrigens (Link) Br. & R. 3. 114].
- „ 28. *Discocactus tricornis* Monville [=D. alteolens Lemaire; Br. & R. 3. 218].
- „ 29. *Echinocactus echinoides* Salm-Dyck [=Copiapoa echinoides (Lemaire) Br. & R. 3. 88].
- „ 30. *Echinocactus marginatus* Salm-Dyck [=Copiapoa marginata (Salm-Dyck) Br. & R. 3. 86].

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Louis (later Ludwig) Carl Georg **Pfeiffer**¹ was born at Kassel, Hessen Nassau, on July 4th, 1805. He was the son of a Hessian higher appeal court official ("Kurf. hess. Oberappellationsgerichts-rath" B. Wilhelm Pfeiffer), and at the age of sixteen went to the university of Göttingen, then to Marburg, taking his degree in medicine in 1825 and then continuing his studies at Paris and Berlin. In 1830 the Poles of Warsaw rose in arms against the Russians to whom they had been subject since the Congress of Vienna in 1815. Supported by the Prussian government, the Russian government appealed for German doctors to attend the troops engaged in crushing the Polish insurgents. Pfeiffer joined them as a staff-surgeon. After the fall of Warsaw in 1831 he was offered a permanent post in Russian service. A kindly and cultured man, he sympathized too much with the unhappy Poles to accept the offer; he returned to Kassel. In Poland he saw much of the dread disease cholera which was then sweeping northward and westward from India, and a little medical work based on his experience is his first publication. He practised medicine for a time, then abandoned it and devoted himself entirely to writing, music and scientific pursuits. His industry was colossal. He translated foreign medical works into German, botanised extensively in his native Hessen, visited Cuba in the winter of 1838-39 compiled a vast index to the families, genera and sections of flowering plants (*Nomenclator botanicus nominum ad finem anni 1858 publici juris factorum, classes, ordines, tribus, familias, divisiones, genera, subgenera vel sectiones designantium enumeratio alphabetica*; 1698 + 1752 pages; Kassel, 1873-74) and became the leading authority of the day on cacti and land-snails—a somewhat unusual combination of interests! Visits to Schloss Dyck, the residence of Prince Joseph

¹ These biographical notes are based on obituaries in *Leopolding* 14. 7-9 (1878) and *Journal de Conchyliologie* (3) 18. 107-109 (1878); for a portrait, see *Dr. Ludwig Pfeiffer's Malakozoologische Blätter für 1878* frontispiece (1878), reproduced here, p. 41.

zu **Salm-Reifferscheid-Dyck** (1773-1861); and the botanic gardens of Berlin and Munich enabled him to publish at Berlin in 1837 an *Enumeratio diagnostica Cactearum hucusque cognitarum* (vii + 192 pages) and *Beschreibung und Synonymik der in deutschen Gärten lebend vorkommenden Cacteen* (vi + 231 pages). This was followed in 1838 to 1850 by the *Abbildung * * * * blühender Cacteen* listed above. His uncle, Carl **Pfeiffer**, author of *Naturgeschichte deutscher Land- und Süßwasser-Mollusken* (Weimar, 1821-28), imparted to him an interest in terrestrial molluscs, a group which had been somewhat neglected by zoologists. Louis brought the art of describing snails to a high level of precision and devoted about 250 out of his 270 or so scientific papers, as well as several independent works, to their classification, naming and description, and his *Monographia Heliceorum viventium* (8 vols.; Leipzig, 1847-77) remains a standard work upon them. In 1845 Salm-Dyck named a genus of Cactaceae Pfeiffera in his honour; molluscs belonging to the genera Achatina, Astarte, Buccinum, Bulimus, Calusilia, Cyclotus, Cylandrella, Cytherea, Fusus, Helix, Nerita, Pisidium, Planorbis, Pupa, Stoastoma, Succinea, Triton, Trochus and Unio also bear his name. The Franco-German war of 1870 robbed him of a son and, since a life of scholarly research rarely leads to financial gain, straitened circumstances in old age forced him to sell his extensive conchological collections. He died at Kassel on December 2nd, 1877.

Pfeiffer's collaborator, Christoph Friedrich **Otto**,¹ was a professional gardener. He was born at Schneeberg in Saxony on December 4th, 1783, his father being gardener to the Count (Reichgraf) of Schönburg-Glauchau. From the Royal Gardens of Dresden he moved to the Berlin botanic garden in 1801 and became curator in 1814. He visited England in 1816, 1820 and 1829 in search of new or little-known plants not available in Germany, and was elected a Fellow of the Horticultural Society of London in 1817. Owing to ill-health he retired from his official post in October, 1843, but he continued to edit until his death on September 7th, 1856 the *Allgemeine Gartenzeitung* which he and Albert Gottfried **Dietrich** (1795-1856) had founded in 1833. He collaborated with Heinrich Friedrich **Link** (1767-1851), director of the Berlin botanic garden, and later with J. Friedrich **Klotzsch** (1805-1860), herbarium keeper, in the production of three works with coloured plates illustrative of new and rare plants in their charge: *Icones Plantarum selectarum* (1820-29), *Icones Plantarum rariorum* (1828-31), *Icones Plantarum rariorum* (1840-44).² In 1821 Kunth dedicated to him a genus of Umbelliferae, *Ottoa*; various specific names such as *Malacocarpus Ottonis* (Lehmann) Britton & Rose and *Lobelia Ottoniana* (Presl) A. De Candolle also commemorate him, but *Begonia Ottonis* Walpers, *B. Ottoniana* (Regel) A. De Candolle and *Scelochilus Ottonis* Klotzsch are named after his son Eduard **Otto**, who collected in America and was for some years curator of the Hamburg botanic garden.

¹ For a detailed obituary, see Otto & Dietrich, *Allgemeine Gartenzeitung* **24**, 289-291 (1856).

² For dates of publication of these, see Stearn in *Journ. Soc. Bibl. Nat. Hist.* **1**, 105-107 (Dec. 1937).

The Changeover

By Rev. F. C. Champion

IN May this year I was appointed to another benefice ten miles away from my old country benefice in the Malvern country. The problem arose of how to convey a collection of cacti and succulents from one country vicarage to another. The furniture remover gave one look at them and said that he would not be responsible. At last the general coal dealer and haulier in our village was entrusted with their safe conveyance. The difficulty was that they could not be housed in a greenhouse as I was having a new one erected. They were compelled, therefore, to have a sojourn out of doors. It is of this sojourn that I want to record results because I have always planted some cacti and succulents out of doors in the summer, yet it is very interesting to see what happens when one is compelled to submit an entire collection to the elements. Those cacti were put to stand anywhere in the garden the first week in June, and if you wish to remember anything about the weather of the summer, 1939, you will remember that it rained and it rained. Nothing could be done, the poor plants had to stand it, and it was not until summer was on the wane that they were comfortably housed in a brand new greenhouse in a sunny but sheltered corner. And now for results. Let me say first that I planted a small round bed with opuntias, some of the taller varieties of cerei and euphorbias, coming down to a ring of varied coloured succulents on the outside, but the rest of the plants stood together in a drive.

I record, first of all, with very deep regret, the passing of nearly all my stemless mesembryanthemums; I thought that I had saved some of the lithops tribe, but when taken indoors they just went yellow as if suffering from an acute bilious attack and then passed quietly away. I have a good bowlful of rhombophyllum and these, in spite of being so soaked in the rain that water actually stood in a pool surrounding them, have flourished like a green bay tree. A good plant of *Opuntia Verschaffeltii* which I feared might suffer by loss of an arm or two, endured it well. Other opuntias, such as *tunicata*, *senilis*, *monacantha*, *Biglovii* and *vaginata*, all stood up to the climate well. Personally, my experience is that it is quite safe to plant out a border of these handsome plants for the summer months.

Of the mammillarias, the results were on the whole good, in fact they suffered little. I was fearful of such varieties as *M. plumosa*, *pusilla* and *Klissingiana*, the more woolly types, and one or two with white wool did get to look rather dishevelled, but they are recovering now.

I lost one or two cerei; the rain and moisture proved too much for *C. Spachianus* and *versicolor*, and *C. fossulatus* assumed spots to an alarming degree and is still rather blotchy even now. *C. marginatus* which, being rather a sickly fellow, I thought would go under during its exile, stood up to it, but he is a slow grower and remains a dwarf even unto this day. *Machaerocereus eruca* or the Creeping Devil, seems to stand anything and, no doubt because of its kinship with the evil one, it thrust out more red spines. *Pilocereus Trollii*, a great pet of mine, lost all its lustre in the rain and looked very much the Old Man of the Andes, as I believe its common name is, when it was brought indoors; it still looks rather unhappy as to its fur coat. The phyllocacti flourished and bloomed where they

stood, as did, of course, many other varieties, but then phyllocacti are always giving us surprises. My little favourite rebutias and lobivias stood the wet summer well; like several other species they did their share of blooming. I remember now looking from my study window during a burst of sunshine and seeing *R. salmonea* opening its lovely pinkish trumpets in all its glory. Alas that such beauty tarrieth but a day! *Echinopsis Eyriesii* and *E. multiplex*, together with *Echinocactus corniger* and *platensis* just seemed to enjoy the wind and the rain, and waxed greener and fatter.

Now as to succulents, besides the aforementioned stemless mesembryanthemums (who can blame trade catalogues for calling them Mesems) the euphorbias did not like the rain too well, and I lost *E. fimbriata*, *abyssinica* (a large plant, alas) and a plant of *E. canariensis*; otherwise the succulents generally stood the wet season well. The stapelias looked very miserable, and *S. nobilis* and one or two others from my twelve plants have died from excessive moisture. The bryophyllums liked the rain, *B. Daigremontianum* rose to a considerable height and produced a colossal number of children. My one plant of *Rochea falcata* looked sickly and pale, but it has recovered and is now in bloom. A good-sized plant of *Aeonium atropurpureum* liked being out for the summer, and looks all the greener and purpler for it. I was a little anxious about some of my choicer sorts; *Cotyledon macrantha* only just survived while the other cotyledons and crassulas flourished. I was anxious about a new lot of haworthias which I had recently bought; they were in very small pots and had received a good shaking in transit; however, with the exception of about two, all bloomed. *Portulacaria afra* liked the wet so much that it has not looked so well in captivity; its leaves have lost their bright green lustre. Echeverias, especially *E. setosa*, and also the aloes, quite enjoyed themselves. Before I conclude I must relate the story of *Euphorbia splendens*; lying on the ground outside the potting shed, cast out, given up as dead, it was seen to have little nodules on its brown and dead-looking stem; I gave it a second chance, potted it up, the rain brought forth little green leaves and lo! a bud; now it is in flower. Beware what you cast away.

And now all my plants are housed in their new home, a joy to me, a puzzle to the uninformed in cactus lore, a matter of contempt to the gardener whose mind never rises above the Brassica family. May they, after their soaking of summer, 1939, live happily ever after.

Book Review

Cacti for the Amateur by Scott E. Haselton has already been noticed in this Journal; this has now been followed by *Succulents for the Amateur*, edited by Scott E. Haselton and written by J. R. Brown, Alain White, Boyd L. Sloane and G. W. Reynolds (published by the Abbey Garden Press, Pasadena, 1939; price \$ 2.20), in which the same high standard has been maintained. This book will be of great value to all collectors of succulents; some 800 species are mentioned and 400 of these are illustrated; the illustrations are remarkably good and include 17 coloured plates.

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Established 1931

Vol. 8

JULY, 1946

No. 3

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ESTABLISHED 1931

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EDITORIAL

After a lapse of six and a half years, it has been possible to continue the issue of the Journal.

It may be regretted that some effort had not been made to keep the Society functioning during the war, but it was difficult in those early days to decide which course would be the most wise. Members were evacuated, collections had to be neglected, and we were all too pre-occupied in various tasks connected with the war effort—the decision, even if the reader considers it was wrong, was a very understandable one.

The past is happily, now, the past, and we look forward to the future with hope and confidence. The re-appearance of the Journal is a harbinger of the good things to come.

The resuscitation of the Cactus and Succulent Society of Great Britain and its Journal comes at a time when collectors everywhere are awakening to a renewed interest in their plants. There is an urge for literature on cactus.

Unhappily, plants are in short supply until the American Loan is settled. That is, however, a passing phase, and, with the passage of time, we shall be able to acquire the plants we need.

The Journal is your own. If it is not up to standard, then it is your duty to instruct the editor as to his duties! He wants your comments, your suggestions, your help, and certainly your criticisms.

We are very short of articles on succulent plants, apart from cacti. Except for mimicry and similar plants there seems to be few informed collectors in the country. If you can help your fellow members do please come forward with articles and illustrations.

MAMMILLARIAS

Lecture by E. SHURLY, Birmingham, 15th May, 1946

My subject is not why I am interested in Mammillarias, but rather what the genus represents. Surprisingly few collectors could explain why a certain genus is separated from another. Many books provide the information, but are so complicated to those unversed in botanical literature, that it is considered some explanation will be helpful, particularly to the beginner.

The first reference to Mammillarias is in Breyn's Prodomus of 1679. The actual words are "Opuntia Echinomelocacti effigie tuberosa, fructu levissime amethystino. Nobis. In Horto Beaumontiani, cum fructibus. Florem non vidi." Otherwise, "Opuntia Echinomelocacti (a description covering cacti in those days), form full of tuberances, fruit smooth, amethyst coloured. Beaumont Gardens with fruit. Flowers not seen." "Nobis" is Latin for "myself," meaning that the writer is responsible for the description.

At this time, it was the only Mammillaria known. Hermann, in his Paradisus Batavus 1698, page 136, refers to two plants, "majoribus" and "minor," greater and lesser. The first was the type plant of the genus, MAMMILLARIAS, the other PROLIFERA. Hermann also gave the first mention of the name MAMMILLARIAS, but it is obvious that it then meant a cactus with tubercles. This was in a reference to a book by Plukenet, which I have not been able to trace as, so far as I am aware, the first book by Plukenet to mention the name was published in 1720, but he did publish his Phytographia sive Stirpium Illustrorium in 1691, although I understand it has no reference to our subject.

The first mention of PROLIFERA, by name, is Miller's Gardeners' Dictionary of 1768.

Linnaeus' Species Plantarum, page 666, records one plant, MAMMILLARIAS, and this is the first official record, botanically speaking, as it has been ruled that botanical history, so far as naming is concerned, dates from the publication of his books, Genera Plantarum (1737), and Species Plantarum (1753).

Haworth's Synopsis Plantarum Succulentarum 1812, page 177, founded the genus Mammillaria. His description is inadequate, and I would recommend that of Britton and Rose in 1923 as the one on which to base the study of the genus, but their description is unsatisfactory in some respects.

First, "Plants, globose, depressed-globose or short cylindric, occasionally much elongated." This covers almost every shape, but a few more could usefully be added, such as top shaped, like WIESINGERI, and plate shape, like APPLANATA.

Next "some with milky, others with watery juice." Britton and Rose list some plants that, occasionally, have watery sap and sometimes milky. Generally speaking, plants living in arid habitats and nearly all with hooked centrals, have watery sap. Milky sap, exuding from the plant, almost instantly oxidises and forms a lump of something like chalk, effectually sealing any wound.

"Tubercles arranged in more or less spiraled rows, never on vertical rows, terete, angled or sometimes flattened, never grooved on upper surface." This description is inadequate as it does not mention cylindrical tubercles, which represent plants living under favourable conditions. It is interesting to note the spiral formation, which agree in number with the accepted alternation of leaves and, in Mammillarias, they are arranged 5 x 8, 8 x 13, 13 x 21, 21 x 34, the two numbers referring to the counting of the right and left turned rows. It definitely points to a relation between tubercles and leaves of normal plants. The absence of grooves on the upper surface of tubercles is characteristic of the genus.

"Usually bearing wool or hairs and sometimes bristles, but without glands in their axils." A quantity of wool and hairs indicates arid conditions. Compare, say, BOMBYCINA and MAGNIMAMMA. The absence of glands is another essential characteristic of the genus.

"Crowned by the spine areoles." These vary little. All plants have them more or less and they serve to protect the tubercle and to retain water.

"Spines in clusters on top of tubercles, sometimes all alike, sometimes with central ones very different from the radial, all straight or sometimes one or more of central spines hooked." Radials are never hooked. Centrals are usually marked with darker colours than the radials. All but horny spines have down or hairs, called pubescence or puberulence, and these serve to retain moisture.

"Flowers, so far as known, diurnal, all from axils of old tubercles, much alike as to size and shape, more or less campanulate, comparatively small, variously coloured, commonly red, yellowish or white to pinkish." I do not agree that they are "much alike in size, comparatively small." I find that Mammillaria flowers are separated into short and long tubed flowers, the latter markedly greater in size. LONGICOMA, CARRETII and ZEILMANNIANA are examples of long tubed flowers. "Diurnal" means open by day, many Mammillaras open day and night, but no species is purely nocturnal. "From axils of old tubercles" means that in no species does the flower appear from the centre of the plant top, and this again is one of the essential characteristics of the genus.

"Perianth segments rather narrow, spreading." These are invariably in three series, sepals, outer and inner petals. Sepals correspond with the bud covering; they are usually much darker in colour. Outer petals usually have wide centres of a darker colour, while the inner petals usually have paler colours and the centres become narrow lines or midribs. In addition, petals and sepals can be broken in outline or entire, also ciliate (hairs on edge) and without. They are usually oblong, a shape swollen in the middle, terminating in a pointed tip. Segments are individually separate two thirds of their length, the lower third becoming a continuous tube, containing, at the base, the ovary.

"Stamens numerous, borne on base of perianth tube, short, included." "Included" means that they are shorter than the petals and do not protrude. Stamens are filaments and anthers.

"Style about length of stamens." The style, however, frequently extends beyond the stamens, because the stamens bend and are never rigid like the style.

"Stigma lobes linear." Sometimes the stigma is exserted, protruding beyond the petals. Botany teaches that a flower is "perfect" when all its parts agree. That is to say, the sepals may count up to eight, petals, say, twelve, the stigma lobes, say four. Such a flower would be "perfect," not because the stigma lobes are four in number, but because each count is a multiple of four. Abortive parts can be traced, shortened or in embryo. When a lobe forks, the divided parts count as one.

"Fruit usually clavate, rarely if ever globose, usually ripening rapidly, naked, scarlet (M. BRANDEGEEI with some scales and white fruit, according to Schumann) or white or greenish in a few species." I cannot agree that fruits ripen rapidly. Most of them ripen the year following the flower and only some the same year.

"Seeds brown in some species, black in others." Seeds are extremely interesting to study, especially the pits of the black ones, brown seed is rarely pitted. Black seeds indicate an arid habitat and pits extreme aridity. Both colours are seen with net-like markings (reticulated), also with rugose (wrinkled) surfaces.

Two features of Mammillarias, Britton and Rose do not specify, first, roots. They are definite and stable characteristics and aid identification. They are divided into tap and non-tap roots. Tap roots vary in shape from the elongated, carrot type to a molar tooth shape. The latter indicate extreme aridity. When a tap root is destroyed it rarely grows another tap root. However, it will be found that one or the other type of root is characteristic of each species.

The other feature Britton and Rose do not specify is type of growth. I divide growths into simple, cespitose, twin (finger), dichotomous. Simple can be a misleading term, but, botanically, it means that a plant remains single and does not reproduce by offshoots. Cespitose, is the form of "button" offshoots, whether like PROLIFERA and MULTICEPS, the mother plant is hardly distinguishable from the offshoots, or "button" offshoots on plants like MEIACANTHA, LONGICOMA, PILISPINA, where the mother plant is easily distinguishable from the offshoots. Twin or finger growth indicates the type where basal offshoots grow as long as the mother plant and appear like a bunch of fingers upraised. Types can be readily recalled, such as ELONGATA, LEONA (so often called POTTSII), PSEUDOPERBELLA. This form of growth is typical of elongated plants. The final type of growth, dichotomous, is where a plant head divides in two, without becoming separate plants, such as PERBELLA, MORGANIANA.

Britton and Rose divided Mammillarias into straight and hooked spines. They divided straight spines into brown and black seeds, and still further into milky and watery sap. Hooked spines, except for two species, have black seeds and watery sap.

Dr. Craig, last year, produced his *MAMMILLARIA HANDBOOK*, and in this very complete monograph he divides Mammillarias into milky with brown seeds, subdivided into centrals and without centrals (only two species with hooked centrals). The other division is watery sap, practically all with black seeds, subdivided into no centrals, hooked and straight centrals, with a few occasionally hooked.

When experts differ on the treatment of a key, it is not for amateurs to intervene, but most, at one time or another, are bitten with the desire to form a key to suit their own ideas. Keys are a playground for the cactus collector and until some definite, scientific scheme of cacti evolution is established, the subject will continue to confuse and exasperate all concerned with our hobby.

Wheldon and Wesley's List No. 64 is about to appear. It contains a number of items of interest to students of cacti and succulents.

It is interesting to note from the advertisements that there is to be a further edition of Mrs. Higgins' *THE STUDY OF THE CACTI*, with an entirely different and enlarged collection of photographs.

CACTUS UNDER THE HUN

HOLLAND. (From Miss J. J. van den Thoorn, Secretary of the Dutch Society.)

Owing to the paper shortage here the appearance of *Succulenta* must be still suspended.

During the war we were able to publish *Succulenta* until March, 1943 ; but the copies of our foreign members were kept apart, but were lost in the great fire at The Hague, together with all my books. We had to stop in 1943 because the Germans wanted us to co-operate with the German Cactus Society (D.K.G.), which we flatly refused to do. The result was—no paper for our magazine. This might be cited at the Nuremberg trial as a not mentioned war crime of our Protector Leys ! !

I told you about the great fire at The Hague, in which all my belongings, as well as the archives of *Succulenta*, were lost. In March, 1945, the U.S.A.A.F. and the R.A.F. bombed The Hague, as the Huns had their V plant right in the centre of the town. The result was not only the demolition of the V installation, but also the wreckage of a large part of The Hague, because the Huns had stolen 90 per cent. of the fire brigade equipment. For the remaining part of the equipment, no gas was available.

The bombing was a complete success. No VI or V2 started again from The Hague and suburbs. My mother and I, and our servant, who has lived with us for 24 years, were evacuated by the Huns to Apeldoorn, and we were only allowed to take with us clothes, shoes, linen and some furniture. The most important and precious things, books, paintings, silver, family papers, etc., we had to leave at The Hague in the house of my sister, whose house was burnt down just as ours. But my whole family was saved, all our relatives in the Far East too, and these points are the most important things.

And, most important of all is that we are free—free—free ! !

You can imagine our joy at being released from the stains and arrows of the outrageous Hun. As a matter of fact, you know all about their atrocities over here. You can understand that the nearer the front came to our cities the happier we were. Just a year ago, the surroundings of Apeldoorn—I live 12 miles outside—were overcrowded with Moffen, and there were hundreds of cannon but on the blessed morning of the 17th April the Tommies and the Canadians came to slaughter the Moffen, and liberated the oppressed country. We are grateful and proud to have such mighty Allies and we can never forget what they have done for us.

The Moffen stole everything worthy of stealing ; they even stole the bricks of the streets for their famous Atlantic Wall, and the trees of our parks, they even would have stolen the waters of the sea, if they had not needed them to drown the country. But Holland will rise again.

BELGIUM. (From G. van de Weghe.)

I have given up my hobby, I am no longer interested in cacti. When the war broke out I had a collection of over 600 different plants. All are gone owing to lack of heating. As I am now in the middle of the sixties I do not have courage to start again, and I think it is better for me to have some rest now and then.

CULTURAL NOTES

As our Journal could not be published until July, I am afraid that the most interesting time for growing cacti and succulents will have passed. Nevertheless there is plenty of interest in many plants which may be flowering still or producing seed pods. The work of the grower is by no means over, as there is still plenty to do. Look carefully over each plant. Pick the pot up and see if the roots are through the drainage hole. If you are using a form of shingle on the staging you will find that many plants like to get their roots in it. These plants should be re-potted at once. It is not too late by any means to do so and the plant will go ahead quickly and make more growth when in fresh soil. Always give such a plant a larger pot than it has had ; even if it looks out of place it will soon grow and reach the sides.

If any pots appear unduly wet, a few days after having been well watered, they also need re-potting. Do not put this off, as the plant will soon die if soil is waterlogged and the roots will drown. Watch this watering business carefully. I cannot lay too much stress on this, as the watering of cacti and succulents in pots is by far the most important part of growing them. More plants are lost by over watering than by all the other errors put together. It is best to water in the morning, if possible, as then the soil in the pot is more likely to be uniformly dry than in the evening. The heat of the day may dry the surface of the pot, but underneath the soil may be too wet to require re-watering. Always remember to leave sufficient space at the top of the pot for watering. It takes quite a fair amount of water to really soak all the soil in a reasonably large pot, and it may be necessary to go over the pots a second time to ensure that all the soil is well moistened. You may prefer to stand the pots in water, but with a large collection this is a long and difficult task. Water well while you are at it and then leave until the soil is quite dry before doing so again.

September is the month when you can gradually reduce watering. A great deal will depend on the weather, and also where the plants are kept. Plants kept on shelves or in windows of the house should be the first from which to withhold water, whilst those in a greenhouse which can be heated need not be treated so during this month. In any case don't be tempted to water any pot whilst the soil is still damp ; if you do you are asking for trouble, and will probably get it. It is impossible to state definitely when to start reducing the watering as so much depends on the position of the greenhouse and how soon the pots will dry out again. Generally speaking, for owners of greenhouses there is no need to reduce much this month.

Look over your seedlings. There is still plenty of time to re-pot into larger pots if they need it, and if you can keep a growing temperature for them they do not need any resting period. If you can put them near your heating pipes and keep the temperature at a minimum night temperature of 50 degrees, rising to about 60 degrees—65 degrees by day they can still be grown on.

Succulents should be examined and all dead, dry leaves around the stems should be removed. This not only improves the look of the plant but will prevent dampness or mildew during the winter. Try and turn each plant so that a fresh part is exposed to the sun. You will probably find a mealy bug or two on the sides away from the sun. Attack these now, spray or better still paint with a camel hair brush with one part nicotine to 40 parts methylated spirit. Afterwards rinse well with soapy water. The nicotine will not harm the plants but the methylated spirit might.

D.D.T. will not kill mealy bug or red spider, so take care with any mixture of it that is claimed to do so. It is probably dissolved in petrol, which latter will soon kill your plants, as well as the bugs,

I think that it is a wise policy to remove the old, dried skins from Conophytums, etc., at this time of the year as long as they come away easily. If left they may hold moisture and start a rot.

October is the month when all must reduce watering to a minimum, except for growing seedlings that can have warmth. Towards the end of the month we are almost sure to get a sharp frost or two ; generally the last few days of October bring a sharp frost at night, at any rate in the London area. See then that your seedlings and any tender succulents are near the heater and as far away from the glass of the house as possible. Those with plants indoors or in an unheated greenhouse need not water again. Remember that cacti are easily able to stand several degrees of frost as long as they are dry. I have known many kinds of cacti stand over 12 degrees of frost in a greenhouse without coming to harm. Should your heaters fail on a severe frosty night and over 10 degrees of frost registers inside the house cover all plants with newspaper to prevent the sun from thawing them out too quickly and you will probably find no harm will come to them.

If you have shaded your greenhouse during the summer you should now clean all glass thoroughly. This shading business is most awkward in this changeable climate of ours. You get one or two days with the sun streaming down from a cloudless sky, as we did in March this year, and you shade the glass with summer cloud, or whatever you use, then for days, perhaps weeks, you have no sun at all. By far the best way to shade is with blinds which can be raised or lowered as occasion demands. Unfortunately, we are not all able to do this. It is, I think, essential to use some form of shading, as the sun rays through the glass of the greenhouse will scorch many plants, especially the young and more tender ones. I use summer cloud myself and spray or paint this on the outside of the glass in May ; it can be washed off at the middle of September and from then on it is advisable to keep the glass as clean as possible. If you have a greenhouse that has an end or side facing East you can leave this fairly clear at all times, as the sun has not enough power to damage the plants in the early mornings. You may also be able to arrange that the plants get some sun in the evenings. When arranging your pots at this time of the year make sure that you do not place any under a drip from the roof, as this may cause damage during the winter.

You will be considering now your heaters, which you may have to bring into use soon. I am not going to state definitely which form is the best, but I personally prefer electricity. I have graduated through most stages of paraffin oil, coke stove, etc. ; some elaborate and some very much a la Heath Robinson, and I now use electricity and find it much easier, safer and cleaner, and providing a thermostat is fitted and a low temperature aimed at, it is not expensive.

A. BOARDER

Having seen the success of D.D.T., in the Far East, as a means of killing mosquitoes and other insects, I decided to use it to kill the mealy bug on my cacti. D.D.T. can be bought both in powder and liquid form. Half of my plants I sprayed with the liquid and the other half with the powder.

Within two weeks all the former died, but the latter survived.

Major D. de C. SMILEY, M.C.

A CACTOPHILE GOES TO WAR

By Major D. de C. SMILEY, M.C.

In January, 1939, I was sent with my regiment to Palestine. We were, at that time, horsed cavalry, and formed part of the 1st Cavalry Division. We were stationed first at Tulkarm—an Arab town at the S.W. corner of an area then known as the "triangle of terror," a triangle with the towns of Tulkarm, Nablus and Jerin as corners.

In every part of the country that I visited I only saw hedges of prickly pear. Of course, I saw cacti, but only in the window boxes of houses in Haifa, Tel Aviv and Jerusalem, probably a continental custom brought in by the Jews.

During my military training I took part in exercises held on the battlefields of the 1st Great War. I remember in particular being shown the site of the Turkish defences at Gaza, some of their trenches are there to this day, and it was easy to appreciate the successful way in which the Turks had used the cactus hedges as obstacles. As a soldier, I would far rather face a barbed wire fence than a thick hedge of prickly pear.

On visiting the places in Jerusalem one knew so well from the Bible, I recalled how the Crown of Thorns was supposed to be made from EUPHORBIA SPLENDENS, but I never saw one in Palestine.

During the summer months, fruits of the prickly pear were sold by street vendors in Haifa and Tel Aviv under the name of "sabra fruit," and were usually sold off blocks of ice on the street barrows. The spines had all been shaved off and, by cutting two grooves down the sides of the fruit, the skin came off easily and the very delicious tasting flesh was left.

In November, 1940, I joined the Middle East Commandos, and we were sent to operate from bases on the Sudan—Abyssinian frontier, in the area of Gallabat and Metemma. Our main task was raiding the Italian lines of communication which led to Gondar on Lake Tana.

My hopes rose in the expectation of being able to find some new or rare types of cacti, but again the prickly pear was the only type I saw.

In April, 1941, I returned to Egypt and then rejoined my regiment which had been sent, with a very small force of British troops, to quell Raschid Ali's revolt in Iraq. We relieved the besieged garrison at Habbaniya and pushed on to finally occupy Baghdad. Cacti were there, but again only prickly pear.

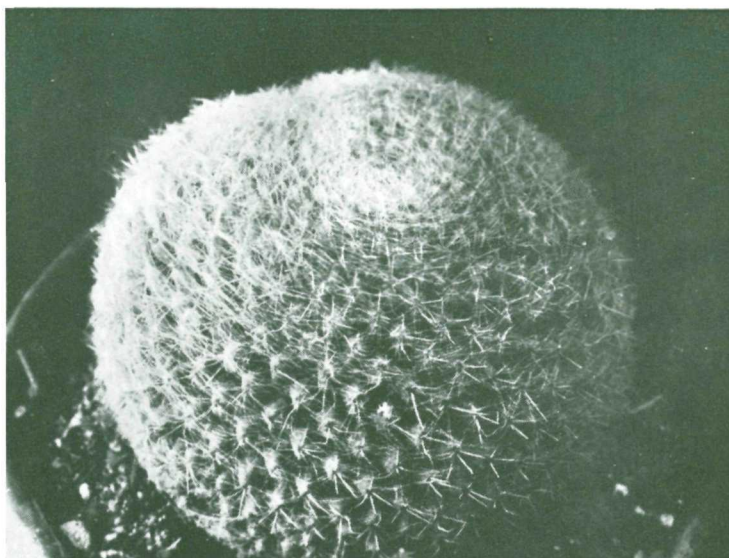
After a short breathing space, we marched into Syria—this time to fight the French. We advanced on Palmyra and then on to Homs and Aleppo. The heat was severe, the fighting hard, and when it was all over we had a short rest in Aleppo before being on the move again. This time back along the Euphrates to Iraq and then into Persia. We had only a very little fighting to do in Persia and, finally, moved into Teheran which we jointly occupied with the Russians.

In all my travels in Syria and Iraq I saw plenty of prickly pear, but not one other type of cactus.

In 1942, I went to the Western Desert for six months, to Cyprus for three months, and then back into the desert to take part in the 8th Army's advance from Alamein. At one time or another I was at Mersa Matruh, Sollum, Capuzzo, Bardia, Tobruk and Derna. Yes, I saw cacti too, but only what was by now becoming my pet aversion—prickly pear.

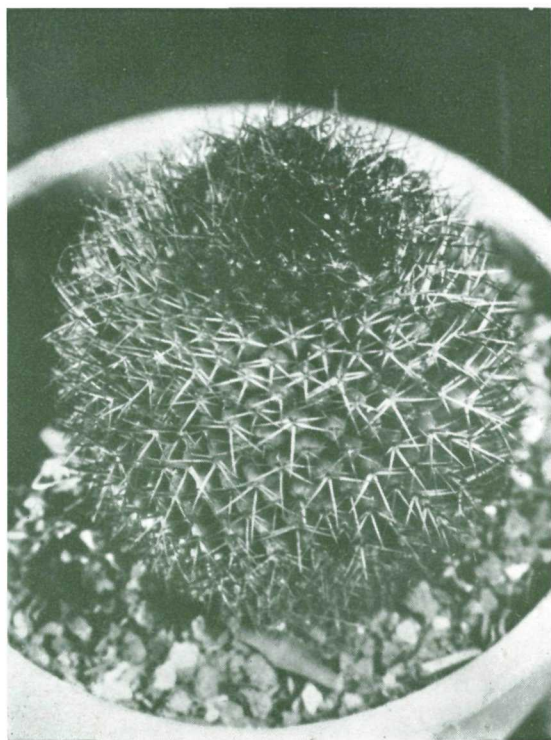
In April, 1943, I was parachuted into the Northern Epirus area of Greece, from whence I made my way into

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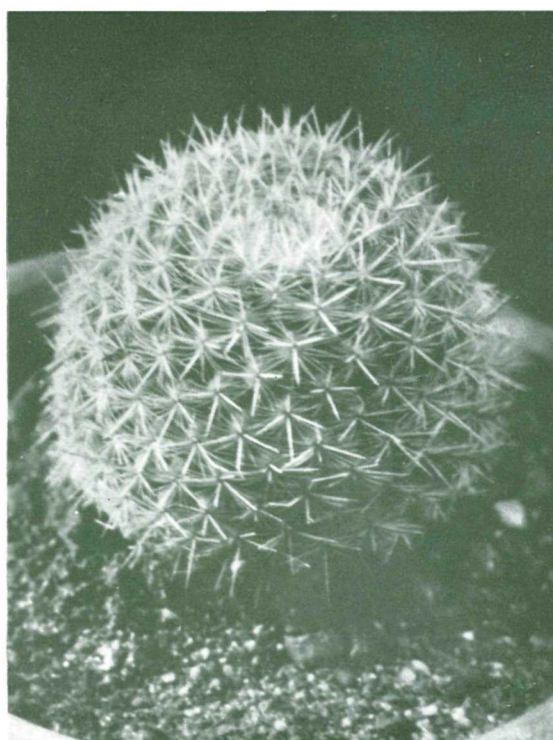
MAMMILLARIA TARAJAENSIS

Schmoll



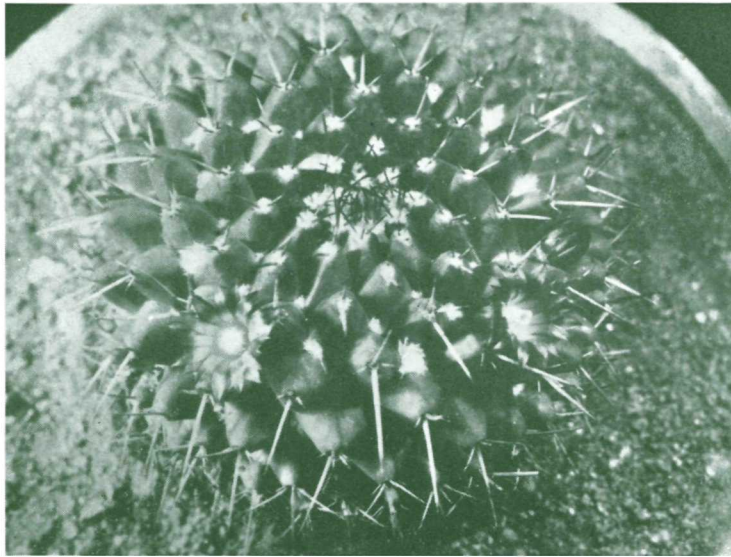
M. KELLERIANA

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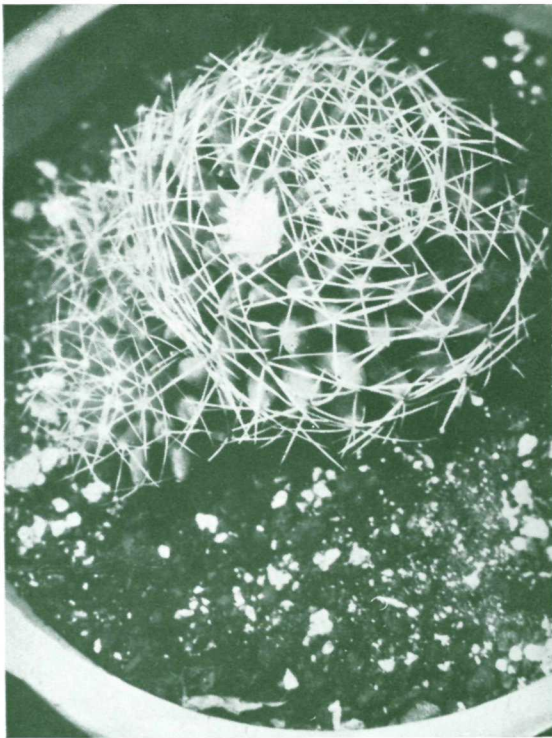
M. LEUCOCENTRA

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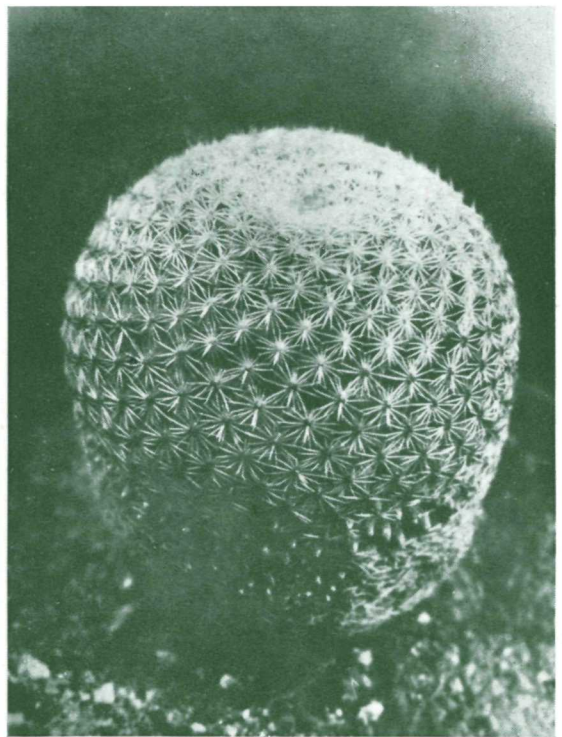
M. BUCARELIENSIS

Schmoll



M. ALBESCENS

Schmoll



M. MARTINEZII

Schmoll

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Albania. I served there for about two years with the guerillas, with one break of three months, when I was sent out and then parachuted back again.

The only cacti I saw were again prickly pear, and lots of these were growing in the coastal area in the south of the country, near such towns as Valona, Himara and Saranda, known at that time as Porto Edda, after Mussolini's daughter. I did also see a few succulents in this area, such as Euphorbias, Aloes, and some I could not identify.

In 1945 I was sent to the Far East, where I felt at last I would see all the cacti I wished, but again I was disappointed.

After a period of training in jungle warfare in Ceylon (yes, plenty of prickly pear), I was, at the end of May, parachuted into Siam. I spent seven months there working with the underground movement, and several times went to French Indo-China. I saw some lovely plants including orchids, growing wild, but no cacti bar prickly pear.

Before returning home I had a spell of leave in India, and here for the first time, I found other types of cacti growing wild. I saw most of these from the little train that takes one up the mountains to Simla. I identified *Cereus Peruvianus*, but most of the other *Cerei* and *Echinocacti* flashed past before I had time to decide what they were.

As can be seen, I really came across nothing but prickly pear when in the wilds, but I cannot conclude this article without mentioning a visit I paid to Cairo, in 1940. This was to the garden of the palace of Prince Mohamet Ali, the uncle of King Farouk. He very kindly gave me permission to see over his garden after being told I was a cactus fan.

In his garden was the most beautiful collection I have ever seen growing out of doors. I spent the whole day gazing in admiration at these huge plants, many of which were in flower, and I could have spent many more days there if time had permitted.

Before the war, I visited Central and South America, and having been in 28 countries during the war, I can safely advise anyone wishing to go on a cactus hunting expedition, to go to the Americas. If, however, they wish to collect prickly pears, and I have seen cuttings on sale in London flowershops for 5/- each, then go to the Middle and Far East by all means.

The re-appearance of Jacobsen's *SUCCULENT PLANTS* will be welcome at a time when it is so difficult to obtain this extremely valuable book.

Lindsay Drummond, Ltd., say that *Woods GROW THEM INDOORS* is now out of print. They hope to reprint Borg's *CACTI* in 1947.

SEARCHING FOR FEROCACTUS JOHNSTONIANUS

A visit to Angel de la Guardia Island

By HOWARD E. GATES

We do not know the story of how it got there, but a diesel-motored boat from the California fishing fleet had fallen into Mexican hands and was being operated by some native fishermen in the lonely upper portion of the Gulf of California. We found it at the little settlement on Los Angeles Bay on the western shore of the Gulf. This really was a stroke of good fortune as, a few years before, when I wished to visit Angel de la Guardia Island from the same port, it was necessary to make the trip over twenty miles of open water in an eighteen-foot dug-out canoe, manned by three barefoot natives.

As the remnants of colour, left from a gloriously brilliant sunrise, faded into the clear blue sky, the steady " chug, chug " of the diesel motor was sweet music to our ears as our eyes watched the little village of the gold miners and the group of date palm trees, clustered around the life-giving spring, fade into the shadows of the base of the mountains. This part of the peninsula is often called " The Waist " because of its constricted width, but it could just as well be called " The Waste," as it is the driest and most barren portion of all. To a resident of Britain, the mountains behind the village are unbelievably bare. In fact, so bare, that at a little distance, they look like cardboard cut-outs tinted in pearls, grays, browns and blacks. This barren state is due to the fact that this district lies between the winter rains of the north and the late summer rains of the south. There may be rain in any month of the year, or none at all for several years, and in any event there is never very much.

The weird beauties of the fading shore did not hold our attention very long, for just outside the wide-mouthed bay lay the little group of Smith Islets. These are merely the barren, rocky tips of some hills rising from the floor of the gulf. One drew our attention because it appeared to be a perfect cone, crowned with a wreath of white clouds. Another was even more interesting, for on its rocky summit I found the most unusual Mammillaria that I know of. It is now known as MAMMILLARIA INSULARIS, and its appearance may be best described as looking like a molar tooth with its several roots. All that appears above ground is a low crown of hemispherical heads covered with white spines, interspersed with black hooked ones. The remaining three-quarters of the plant is a fleshy, subterranean body, which splits into several tapering roots. The white heads of a specimen I photographed were so nearly hidden amongst the small rocks which covered the ground that I placed a larger dark stone behind it so I would be able to locate the plant when the photograph was finished. Its flower is one of the largest in the Mammillaria group, a bright pink in colour, very much of the order of another strange Mammillaria known as

BARTSCHELLA SCHUMANNII, which it was my good fortune to gather in flower on the very tip of the peninsula of Lower California.

As we passed these islets, my companion dropped a line overboard, and in a short while there was a mighty yank, followed by a thrilling fight which ended as a brilliant fish of the Dolphin group, known as the Dorado, was lifted over the side. Dorado means gilded, and this fish is properly named as the rich green, blue and yellow colours of the fish appear to be overlaid with gilt. I know that, to go hunting for one of the rarest of cactus and catch one of the sportiest fish there is while on the way to the hunting grounds, really sounds like a fish story.

After several hours of steady travelling, our objective, a canyon leading down to an indentation in the shore, came into view. There was much speculation as to whether we would find what we were seeking, as Angel de la Guardia Island is forty miles long, a bare range of highly-coloured mountains arising from the deep waters of the gulf. In its whole length there is not a human habitation, as there is no fresh water of any kind. So hot and dry is the island the great, giant *PACHYCEREUS PRINGLEI* and *LEMAIREOCEREUS THURBERI* of the peninsula are here dwarfs, hardly recognisable as the same plants. As we drew close, yelping and barking, as of a great pack of dogs, came to our ears. A little closer we found that these sounds came from the dark forms of countless seals which littered the rocks along the shore. The hills were splotched and streaked with highly-coloured mineral stains, but search as we might, no specimens of *FEROCACTUS JOHNSTONIANUS* were to be seen.

After landing on shore, we started up the bottom of the canyon as the very few specimens I had found, on the earlier canoe trip, were all on the sides of a small ravine. But like gold, the treasures of a plant hunting trip are not always where you expect to find them. The canyon and its side walls were bare, so with a wary eye open for lurking rattle snakes, we climbed the steep southern bank to the rolling table land above. The table land was thickly studded with rocks of various sizes, all sunburned to a uniform dark chocolate-brown colour. Over all lay the shimmering heat waves, as this was mid-day in September, but amidst the rocks, thinly scattered here and there, were the yellow balls and short heavy columns of the *FEROCACTUS JOHNSTONIANUS*. Real beauties they were, too, as the spines were all a brilliant yellow except for occasional plants which had delicate pink ones amongst the yellow. Since the ground was warm to our feet, and the rocks too hot to sit upon, we did not spend much time admiring the plants with their crowns of clear yellow flowers. We selected and dug the specimens we wished and tied the roots together into bundles, so we could carry them down the rough and rocky bottom of another ravine to the shore. Nearly exhausted by the rigors of the search, and the excessive heat, we immediately stripped off our clothes and plunged neck deep into the luke warm waters of the gulf, while one of the Mexican fishermen made his way around to the landing cove and returned with the fishing boat.

After nearly ten years, a number of these plants are growing lustily, blooming and setting fruit freely, in my Lower Californian Botanical Garden, but they hardly resemble the glorious specimens they once were, as this is one of the kinds that gradually loses its brilliance in damper climates.

STAPELIAS

A SHORT ACCOUNT OF THE GENUS

Stapeliias, not Stapelieae. The termination " eae " always indicates family or tribe, never the genus. Stapelieae include

Caralluma	Hoodia	Stapelia
Diplocyatha	Huernia	Stapelianthus
Duvalia	Pectinaria	Stapeliopsis
Echidnopsis	Piaranthus	Tavaresia
Edithcolea	Sarcophagophilus	Trichocaulon

The genus, Stapelia, was named after J. B. Van Stapel, a Dutch physician, who was engaged upon his " Theophrasti Historiae Plantarum Libri X," when he died in 1636.

According to White and Sloane, there are 86 natural species, with a few important hybrids and a " bewildering horde " of minor varieties and hybrids. Hybridisation with succulents is one of the difficulties and misfortunes of collectors.

Stapeliias strike the observer as odd plants for their queer shapes and porrect, thrusting growths, seem so cactus like, yet so unnatural because of their bareness of spines. Apart from their queerness, the most striking feature is their truly extraordinary flowers.

The stems are short, rarely as much as eight inches high. They are roughly four-angled, although, occasionally, one meets with five or six angles. Leafless, they nevertheless have small protuberances, characteristic of their Tribe. In texture they are soft, distinct from the hardish feel of certain of the Euphorbias. They freely offshoot by basal growths which grow to similar lengths, like outstretched fingers.

The most remarkable characteristic of the plant, as already stated, is the flower. These usually break from the axils in the notches of the stem. They are extraordinarily marked with bars and mottled effects that make their appearance bizarre in the extreme. Generally in sombre or dull colours, never bright and cheery, like usual flowers. The petals are always five lobed, usually entire, but sometimes are broken into two or three clefts. The flowers of *S. GIGANTEA* develop to a diameter of twelve inches, and the flowers of the genus are always so large that they dwarf the naturally small plant. They are foetid, colloquially known as the Carrion Flower, giving off a smell like rotten meat. This attracts bluebottles and these insects lay their eggs around the corolla in a pile and, if left undisturbed, numerous grubs appear who, finding no food, die. Interesting as an experiment, but a nasty sight. The smell is not so offensive to human beings, although some people claim it is strong enough to repel them, but insects, with their more powerful senses, are attracted. The fruit has been described as two follicles (sacks or bags), containing comose (hairy tufts) seeds.

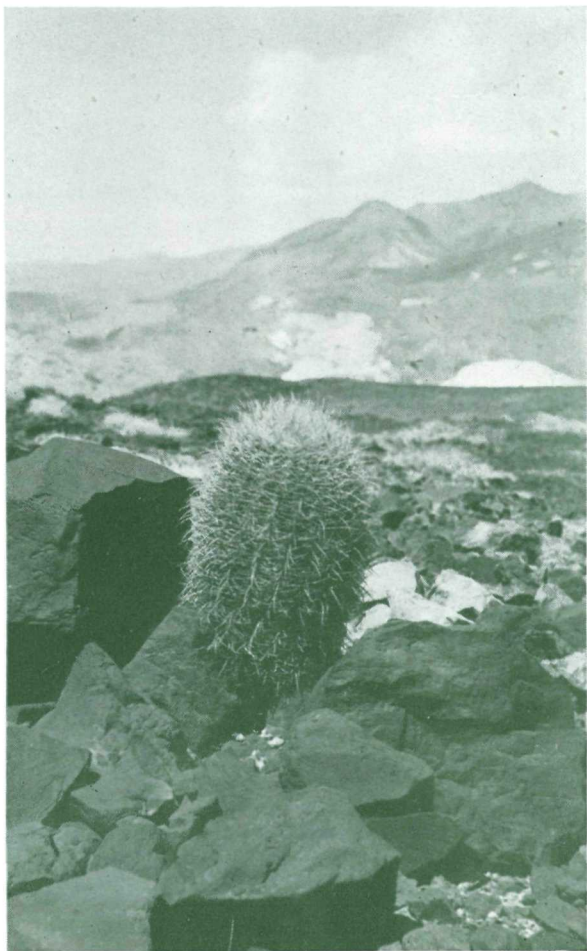
The genus, when in flower, is distinguished from its near neighbours, Caralluma, Huernia and Duvalia, by the long tube hanging with the flower at its end, Duvalia has a tube which is much shorter, the other two genera have hardly any tubes. The types of flowers are, however, so distinct that no difficulty will be met in separating the genera. In outer appearance, it is easy to distinguish the genus from Huernia by the triangular denticular formation

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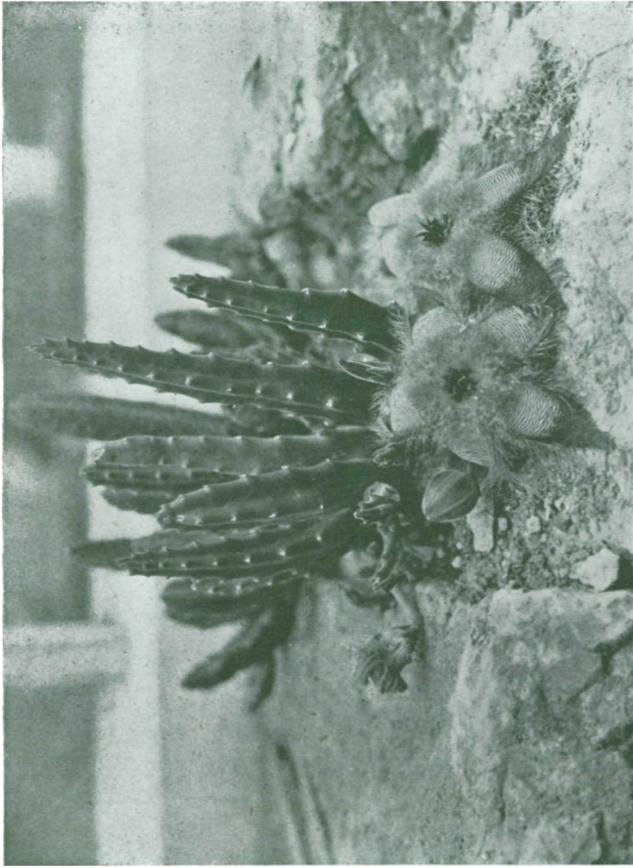
The Shore of Angel de la
Guardia Island

HOWARD E. GATES



HOWARD E. GATES

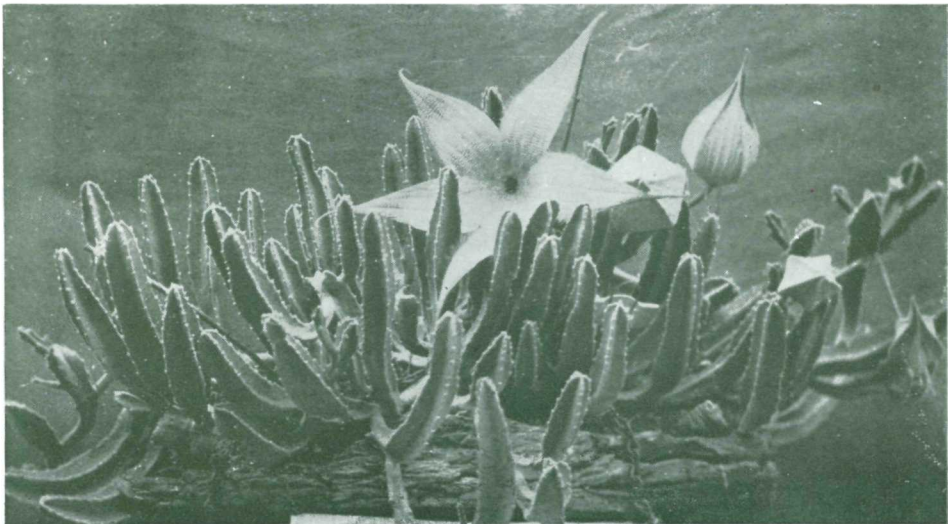
Ferocactus Johnstonianus
on mesa, Angel de la
Guardia Island



S. HIRSUTA



S. GETLEFFII



STAPELIA GIGANTEA

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of the edges of the latter, while in *Stapelia* they are almost flat at the top, sloping and merging with the stem at their sides. In *Duvalia*, the protuberances are much more numerous and are regularly, but bluntly triangular but not so sharp and "stern" as in *Huernia*. With *Caralluma*, the difference is not so obvious, they range from almost fat *Rhipsalis* form of growth to short, stumpy stems, in fact, it is generally considered difficult to define the separation of *Caralluma* and *Stapelia*.

White and Sloane found it convenient to divide *Stapelias* further into *Stapeltonia*, plants mostly with pubescent stems, the flowers never with an annulus (round corolla); Miscellaneous forms, mostly with glabrous stems, some species developing an annulus; and *Orbeas* with a very characteristic and well defined annulus. The well-known *S. GIGANTEA* is a *Stapeltonia* and the equally well-known *S. VARIEGATA* is an *Orbea*. The Miscellaneous section is less well-known. It will be seen that the formation of the flower is the most striking method of differentiation, but the different plants, placed side by side, will immediately indicate the different sub-genera.

Nearly all *Stapelias* come from the Union of South Africa, but about a dozen or so are to be found in tropical West Central Africa.

When the fruit ripens, it breaks and the stem is covered with woolly masses of seed, which can roughly be compared with the "winged" seed of dandelions. In their natural habitat, they drift with the wind to new sites.

Another interesting phenomenon is the pollen, which unites into waxy masses, and are not wholly opaque, but pellucid along one margin or just beneath the apex.

Stapelias need similar treatment to cacti. The soil must be porous, as the plants will not tolerate a stagnant, sour soil. Plenty of drainage, as for cacti. At the same time, being succulents, they want more water than cacti, but care should be taken not to overdo it. If in doubt,—don't, as while cacti will stand quite a lot of maltreatment, *Stapelias*, with their soft and sappy stems, are quick to respond adversely. Incidentally, the sap of the stems is milky. While growing, they like a dry, light and airy position and are voracious sun lovers. Summer and early autumn is the time for flowers. During winter, they should be given a good rest and allowed to remain dormant. Seed germinates easily and only needs normal treatment.

Stapelias can be reproduced easily by breaking off one of the "fingers." Place in sand, after the break has become calloused, keep dry and they will root readily.

To collectors with unusual and bizarre tastes, *Stapelias* have an immediate appeal. They are so easy to grow, to flower and germinate from seed that they should be in the collection of everyone who has a greenhouse and who can protect them from frost, with heat just sufficient to keep frost away. In their native habitat they are subject to extreme cold at nights and it is only their "soft" treatment in this country that makes them difficult subjects with some collectors.

REPORTS OF MEETINGS

March 26th. Mr. A. Boarder gave an extremely interesting lecture on seed germination. It was so informative that it will be used as an article in our next number.

April 30th. Mr. P. V. Collings drew attention to scorching of cactus and succulents by the rays of the sun through glass and condensation. After the winter, plants are more easily affected when the sun appears in the spring. Scorching can destroy tubercles, and leaves unsightly marks. Scorching to roots is caused by the plant being pot-bound, the roots touching the sun-heated sides of the pot. There appears to be no remedy but prevention. Plants bronze when exposed outdoors to the sun, so that two or three weeks' hardening off is wise before doing so. The bronzing will disappear, after a while, if placed in partial shade. One member mentioned that certain seedlings are attacked by white cabbage butterfly and that plants had been lost through snails.

May 28th. The Chairman exhibited four plants of *Astrophytum MYRIOSTIGMA*, each with five "wings," but their arrangement was very diverse. A member exhibited two *Mammillaria SEMPERVIVI*, one labelled *CAPUT MEDUSAE*, synonym of *SEMPERVIVI*, but as both were in bloom, they were obviously different. The former has a yellowish bud with a brown tinge, but the latter has a pinkish bud, and the flowers show further differences when open. Another exhibit, *Mammillaria RHODANTHA* was purchased as a seedling seven years ago and, being placed in a rather dark place, it elongated rapidly, but when removed to light the top developed into a ball. The plant was decapitated. The elongated stem developed offshoots at the top, but the round head grew into the lovely four inch wide plant shown. Re watering, one member suggested a test of humidity of pots by lifting to see if the crocks, at the bottom, were damp, rather than trust to soil at the top. Another suggested a straightened wire paper clip inserted in the soil and, if, as when mother bakes a cake, it comes out clean, then it needs watering, but if the clip has damp soil attached it needs no attention. Another suggested that members complaining of root bug might possibly be suffering from stagnant water, which leaves whitish deposit on the root.

RESUME OF A TALK GIVEN BY MISS MACKENZIE ON THE 18th JUNE, 1946, AT THE ROYAL HORTICULTURAL HALL, ON PHYLLOCACTUS.

Miss Mackenzie said that she was sorry she could not bring any of her plants as they were all too large. She had, however, brought a number of splendidly coloured photographs of *Phyllocactus* in bloom.

These plants are all Epiphytes, which do not like full sun. They should have plenty of drainage in the pots, and about a third of the mixture should be leaf-mould.

After flowering, her plants are placed out of doors in partial shade, and in August they are put in the sun for a time and then brought back in the greenhouse, where they stand the winter under the staging. While the plants are outdoors they are watered overhead in dry weather. They are then brought up in the Spring on the staging, when they should flower by about June.

QUERIES AND REPLIES

If you have a problem, let the Editor have it answered on this page by experts.

S.H.L. (Romford). Where can I get cacti and succulents ?

Stocks are low, demand is great. Until the American loan is settled no import permits are issued. If it goes through it should be easier, as the agreement provides for the removal of trade restrictions.

G.B. (Leeds). I do not get flowers from most of my plants.

Without knowledge of the genera, it is difficult to answer, but it may be too little or too much heat. *Opuntias* do not, generally, bloom unless they are kept at 60—70 degrees ; during winter never less than 50—55 degrees. If free flowering genera are also kept in the same house, these plants may suffer because of too much heat.

H.G.A. (Liverpool). A *Mammillaria* offshoots at the top of plant. Why ?

Probably the growing point has been damaged and, like ordinary vegetative plants, if you stop a plant by pinching out the leader, it will reproduce by side shoots.

P.C. (Barnet). Are insecticides injurious to cacti ?

Some are, but most are ineffective. Too many to enumerate, say which you have in mind. Would recommend Volck for mealy bugs ; flowers of sulphur for red spider and thrips ; a slight touch, just a touch, with a camel hair brush damped with paraffin, for root bug, but this does not cope with eggs and constant attention is necessary.

P.S. (Croydon). Why do spines on most cacti get smaller in cultivation ?

In aridity, roots spread. Botany teaches that the *outward* spread of leaves drops rain on the ground above the tips of roots. A plant from an arid habitat does not spread its roots so much in our greenhouses, so the spines shorten on new growth to coincide.

I.D. (Hastings). Is it possible to clean plants with fine spines or wool ?

Clean plants of what ? Dirt ? A direct spray of water should do this. Mealy bug ? See above, but hand picking should be done with a blunt instrument, as a small piece of wood, but the sharp point of a spine might injure the skin. Wool is impractical where spines are many.

C.F. (Southampton). Which is the best way to re-pot a cactus that has lost its roots through drying up ?

If a plant that roots readily, contact with dry soil or sand is sufficient. If not, then the same method with patience. Many cacti are difficult, some seem impossible, to root. If plant is very dried up, a moist atmosphere, but not damp soil, will encourage it, but beyond certain extremes it is hopeless.

SOCIETY NEWS

Council :

P. V. Collings, *Chairman* A. Boarder Miss H. Mackenzie S. J. Pullen, E. Shurly G. A. Snelling
K. H. Walden C. H. Rowland, *Secretary*

The extra 5/- already notified to members, increasing the 1946 subscription to 15/6, should be remitted to Hon. Treasurer, Miss H. Mackenzie, 24 Buxton Gardens, Acton, London, W.3.

Mr. A. Boarder, Marsworth, Mead Way, Ruislip, Middlesex, the Exchange Secretary, is anxious to know of members desirous to exchange plants and he will put them in touch with other members requiring their plants. Do not send parcels of plants to the Exchange Secretary.

Dates of meetings are printed on the back of membership cards, but during the next three months the following arrangements have been made :—

July 16th	S. J. Pullen	Lecture on GRAFTING.
Sept. 10th	E. Shurly	Lecture on MAMMILLARIAS.
Oct. 8th	Brains Trust	Bring prepared questions.

A visit to the Herbarium and Nursery House at Kew has been arranged on Saturday, 31st August. Members will be notified as to details.

We are trying to arrange a small Exhibition at a R.H.S. Show, in September. Members will be notified, but as time is short, it is hoped that members, intending to exhibit, will make plans well in advance.

The Society pays postage on books loaned from the library, but members pay return postage to the Librarian, P. V. Collings, St. John, Northumberland Road, New Barnet, Herts. The library has quite an interesting collection of books, suitable for beginners and advanced enthusiasts. There is a healthy demand and members may have to wait their turn in the case of certain books, so do not keep them longer than you need, a month at the most, and let other members have their turn.

The Editor, E. Shurly, 7 Deacons Hill Road, Elstree, Herts., appeals for photographs of cacti and succulents for illustration in the Journal. If you specialise or if you can contribute articles, please help him to provide information for the rest of the members.

C. H. ROWLAND, *Hon. Secretary.*
9 Cromer Road,
Chadwell Heath,
Essex.

PROMINENT BRITISH BOOKS ON CACTI AND SUCCULENTS

The earliest British book on cacti and succulents to which I wish to draw your attention is Morison's *Plantarum Historiae Universalis Oxoniensis*. Part 2 was published in 1680, Part 3 in 1699; the first part was never published as the author died before he could prepare it. It is unusual to leave the first volume to be published last. In Part 3, pages 170/1, is given the descriptions of nine *Melocarduus*, one of the names by which Cactus were known in those early days. His Plate 37 illustrates five Cactus (one called *Carduus* and another *Euphorbij*—both *Cereus*), also two *Euphorbias*. One of the Cactus is very reminiscent of Engelmann's drawing of *Mammillaria GRAHAMI* in the *Cactaceae of the Boundary* in 1858, but Morison's shows straight spines. The illustrations and the book is in the old style, descriptions all in Latin.

Next, is Haworth's *Synopsis Plantarum Succulentarum*, published in 1812. No illustrations, but there are 334 pages of cacti and succulents "cultivated in the neighbourhood of London." Under Cactus, as a genus, he describes six plants. On page 177, he founds the genus *Mammillaria* (*Mammillary Thistle*), naming three plants including the original description of *Mammillaria DISCOLOR*. There follows 18 *Cerei*, two *Rhipsalis*, 14 *Opuntias*, one *Epiphyllum* and two *Pereskias*. The rest of the book, 307 pages, is made up of succulents, genera too numerous to detail, but including many of the names with which we are familiar today, also others not now considered succulents.

In 1819 and 1821, respectively, Haworth published his *Supplementarum Plantarum Succulentarum* and *Revisione Plantarum Succulentarum*, but they are not in my library, so I cannot give details, although I have the *Mammillaria* extracts from them.

In the *Philosophical Magazine* of 1824, page 41, Haworth describes two further Cactus and three *Mammillarias*. There are no illustrations. This magazine, generally, deals with lectures and contributions covering all manner of subjects.

The *Philosophical Magazine* of 1830 also contains a contribution by Haworth, on pages 108—118. He describes one *Mammillaria*, five *Cerei*, one *Epiphyllum*, two *Opuntias*, one *Rhipsalis*, new descriptions taken from De Candolle's *Prodromus*. He also describes two *Cerei* from Burmann's edition of Plumier, and he also amends the descriptions of four *Mammillarias*, one *Melocactus*, five *Echinocacti*, five *Cerei*, one *Opuntia*. He remarks that Linnaeus described 23 cacti in his 1764 edition of *Species Plantarum*, *Hortus Kewensis* 24, but when he wrote in 1830, there were ten times more, successfully cultivated. Again there are no illustrations.

There is a big gap until we reach 1933 when Mrs. Vera Higgins wrote *THE STUDY OF CACTI*. The contents are arranged under Historical, Classification, Nomenclature, Geographical Distribution, Uses, Methods of Cultivation, general descriptions, descriptions of the genera followed by a useful Bibliography and the classification of Britton and Rose. There are 16 illustrations. The book is so well-known that it does not need description, but it is notable as the first attempt, in this country, to cover the whole subject and present to readers a cohesive

explanation. It stands out because of its completeness and its clarity. An accompanying advertisement informs readers that a new edition is just appearing.

Finally, there is Borg's Cacti, published in 1937, and now out of print, although a new edition will appear later. He describes 1,187 species in 330 pages. I believe no fresh descriptions, but it is a valuable summarisation with 92 illustrations, followed by ten pages of cultural hints. Taken in conjunction with Mrs. Higgins' book, it is a most valuable aid to the collector.

There were, of course, other books published in this country, such as Allnutt's The Cactus, 1877, Castle's Cactaceous Plants, 1883, Day's Flowers of the Desert, 1938, and a special mention should be made of Watson's Cactus Culture, again unhappily out of print, but another edition will appear in due course. The books mentioned in this paragraph are quite good reading. More recent books which can be added are Wood's Grow Them Indoors and Lamb's Flowering Your Cacti. For the novice mention should be made of Mrs. Higgins' and the Rev. H. Marrable's Cactus Growing for Beginners, which provides helpful hints and other information.

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An Apologia

BELIEVING, unlike the politicians, it is much the best policy to put the position bluntly and clearly before the public, we are sorry to say that all we have to offer, in this first Cactus Journal for seven long years, is our greetings.

In common with all nurserymen of any size, we sacrificed 90 % of our stocks to grow food during the war and, whether we like it or not, it will take five years to get back to our 1939 standards again.

In common with all nurserymen of any size, we were allowed a miserable quota of imports from Holland for stock purposes only, but all imports from the dollar area are impossible NOW, and for a long time to come.

Limited then, as we are, to 4,250 ft. of glass, and to varieties which we can propagate from our own stocks, it is foolish, in our opinion, to issue any form of list.

We are growing good, honest plants of the more common varieties, and exhibit them fortnightly at the Royal Horticultural Hall. Our Miss Russell will be pleased to see you, show you what we have available and discuss with you any problems you may have.

When the currency ban is lifted we shall once again be able to offer a comprehensive range of succulents and will take the greatest pleasure in notifying all our friends.

KENNETH W. HARLE

The Nursery, Lower Basildon, Berks.

THE
CACTUS
AND SUCCULENT
JOURNAL
OF GREAT BRITAIN

Established 1931

Vol. 8

OCTOBER, 1946

No. 4

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EDITORIAL

It has been a great pleasure to note the reception with which the re-appearance of our Journal has been greeted.

A chorus of approval has come from all over the world in addition to our own little islands. Professional publishers' opinion is highly complimentary of the format, type and general lay-out.

We are pleased, but we are not satisfied. There are many things yet to be achieved. For the time being, with the present difficulties, we must content ourselves with the Journal materials, leaving it to better days to bring the scope we desire to its contributors.

On some things, we cannot quite make up our mind and we desire to have your views.

What do you think of the size of the type? Does it incommode some of our more elderly members? At present, 8 point type is used and we can have 800-900 words to the page. With 9 point type we can only have 600. The choice is between legibility and amount of material. To members with normal sight, the type is quite legible, because it is good lettering, which corrects the smaller size.

What do you think of the illustrations? Green ink, as employed for the letterpress, meets with general approval, we have not had one dissentient, but one or two have queried the green illustrations. We are so used to seeing them in black and white that another colour may create the illusion that detail is being lost. The choice seems to be to print entirely in black or entirely in green, as the present number, for a hybrid Journal with green letterpress and black illustrations seems a little incongruous.

We have already said elsewhere that it is for you to tell the Editor what his duties are and he now awaits the call from you. He wants the Journal to be just what you want it to be.

CULTURAL NOTES

By A. BOARDER

In November all watering of cacti and succulents should be reduced. Do not keep adult plants growing, you will not do any good, and may do much harm. Therefore, dry off all plants and do not be tempted to water again this year. This year's seedlings can be kept growing as long as you have warmth. Do not misunderstand me over this seedling question. Provided seedlings are kept at a temperature of 50-60 degrees, there is no reason why they should not keep growing. Even if you only have a small heater, by keeping the seedlings near it you can keep them warmer than other plants which may be farther away.

Now I must apologise for again referring to the subject of heating, but several enquiries have been received from members and I take this opportunity of giving some information on the different methods. Paraffin oil heaters can be used with success in any but very large greenhouses. I have used a Beatrice oil stove with a series of pots inverted on the top. This spreads the heat, as otherwise the heat goes straight up to the glass roof and much of it will be lost. I later used a lamp heating small water pipes, and this proved very successful. The fumes passed into the water pipes, giving out its heat on the way, whilst a return pipe brought the water back into a jacket over the lamp. It is, however, essential that great care is taken with the cleaning of the lamp as otherwise it may smoke and if so the whole of the greenhouse will be festooned with greasy soot. Some oil lamps burn with an ordinary white flame and others with a blue flame. I have never been able to make up my mind whether the blue flame is really the better. You may be sure of this, however, a limited sized wick only gives a limited heat, and to get more heat you must use larger wicks and, of course, burn more oil. After the lamp has been lit, it is essential to examine it soon after, as the flame is sure to draw up. Let it burn fairly high for a time, and then turn it down a bit. Never try to run your lamp at its maximum. If you do you may find that, in the morning, an early sun may have forced the temperature of the greenhouse up considerably and this will encourage vapourisation of the paraffin and will probably cause the lamp to smoke. I have never found the smell of paraffin harms cacti and succulents, but it has a deterrent effect on pests.

The next stage of heating is a boiler with water pipes either heated by a gas jet or solid fuel. Gas may be used for heating the water, but you must remember that only a certain amount of heat comes from a small quantity of gas. I suppose that the majority of greenhouses of any fair size are heated by solid fuel. Anthracite is, undoubtedly, the best for this purpose, if you can get it. Once you know your stove's capacity, you can run it by attention twice a day. Keep it just alight all day, and during the evening rustle the bars so that a good bright glow appears beneath the bars. See that you have a good bright low fire before you finally make it up for the night. Once the water is very hot, you can feed the fire-well with some very small stuff or dust on the top. The worst of this type of heater is that the draught is affected by the weather. Wind often causes the fire to draw excessively, when the water will boil in the pipes and the fire will be out in the morning.

I have come to the conclusion, after forty years of growing cacti under varied conditions, that electricity is the best means of heating greenhouses. This may be used as dry heat or for heating water pipes; the latter is, no doubt, the best, but the former is easier and cheaper to instal. You may buy tubular heaters of any lengths to suit your greenhouse. If your house is 12 feet by 8 feet, you can use two 10-foot heaters, or, say, four heaters each four or five feet. It is best to use a larger area of pipes as then you are not taxing them too much. The usual wattage is 60 watts per foot, so that a six foot heater would rate at 360 watts, and, if full on for an hour would use a trifle over one-third of a unit of electricity an hour. If a thermostat is fitted, and it certainly should be, you will find that the heaters come on and off at intervals, and it is surprising how little electricity is used.

The cost of the tubular heater should be 2/6 per foot, plus an initial 2/6. Therefore, the 6-foot heater should cost 17/6. I use a thermostat that originally controlled the heat in an aquarium, and I find it excellent and not expensive.

An electric immersion heater is, no doubt, the best, as then your heat will come from the water pipes, but an immersion heater costs about six pounds to instal.

For a greenhouse which contains cacti and succulents, set the thermostat at 38-40 degrees. No harm will come to the plants if the temperature drops to 34 degrees, and, providing the soil in the pots is quite dry, no harm will come to any of them. Arrange seedlings just over the heaters so that they are kept at a higher temperature than the older plants. Cold treatment is beneficial to adult cacti in winter, and they usually flower better the following season than if they have been kept at too high a temperature through the winter.

Your thermostat may be adjusted to a temperature of 46 degrees minimum; this is too high, in my opinion, but the regulator may be varied to enable you to set it at a much lower figure. If not, by placing it near the heaters it will cut out before the whole of the greenhouse reaches 46 degrees. There is also an electric heater which heats the oil in pipes instead of water, and as oil holds heat longer, this should prove very economical.

December should be a month of rest for nearly all plants. Perhaps a little water to your *Epiphyllums*, as they bloom at the end of the year; do not overdo it, however. The whole house should be kept as dry as possible. Do not be afraid to open ventilators if the weather is sunny and dry. You cannot give cacti too much air at any time, and the open ventilators will help to keep the greenhouse dry. During foggy and frosty weather, keep ventilators shut. If you have any cuttings of offsets which you have rooted in a propagating box, do not pot these up now. Keep them where they are for a month or two, as you will probably lose them if you shift them now. See your glass is clean inside and out, as the plants want all the light possible during this month of short daylight.

January brings forth the urge to sow seed of cacti and succulents, but unless you have a frame which you can maintain at 70 degrees, do not sow yet. Wait until March or April if you have no means of keeping this growing temperature. It is good, however, to start early, if you can, as then you can regulate the heat better and your plants will be larger and stronger by the following winter. If you are growing from seed for the first time, I would refer you to my article on the subject in this Journal. Lack of success in raising your seedlings may be due to some of the following: old seed, some seed over five years old will germinate, but many more will not. Do not bury your seeds—most germinate best if sprinkled on the top. See that the soil is kept continually damp (not soaking wet), warm and aerated. See that sunshine is excluded from the frame as strong sunshine stunts the growth of seedling cacti. The soil should be sterilised but do not overdo it, or you will kill all goodness in the soil. A watering with a pink solution of permanganate of potash is good and *Limax* sprinkled in the soil is very beneficial.

Do not water any adult plant yet, let them have a good rest. Last season's seedlings may be watered carefully, but make quite sure that they dry out completely before watering again. I do not like to keep first year's seedlings too dry in the winter, as I am sure that if they shrivel up it takes them too long to recover in the spring and they are weakened by this treatment. For those without a heated greenhouse, who keep their plants in a room indoors, I would advise a careful examination of the plants. If they are very dusty they may be syringed over if this can be done whilst they are lying on their sides, so that as little water as possible goes on the soil. It is surprising how many cacti may be grown and flowered by this method. I have myself flowered many cacti which have been kept in a room in the house all the winter. Remember a dry pot in the winter is a safe one and a wet one dangerous.

Now is a good time to inspect your labels and renew where necessary. I suppose that we all have our own preferences as to label material. A fairly strong celluloid is very good, and can be written on with a pencil or indelible ink, but after a few years the celluloid perishes and becomes very brittle, the least touch causing them to disintegrate. I find it very useful to number each plant and keep a reference book with the names in, so that a number only may be used, either for seeds or plants.

(If you have any cultural problems which you would like Mr. Boarder to deal with in his Cultural Notes, please send them along).

THE VISIT TO KEW A Very Successful Day

A record number of members came to Kew on Saturday, August 31st, when Mr. Sandwith conducted the party over the Herbarium and Library so efficiently that everyone was able to appreciate the scope of the headquarters, in this country, of botanical record, experiment and research. The majority were viewing Kew and what it really stands for, for the first time, and were impressed by the vastness of the material that has been collected and collated.

The Herbarium was founded on Sir William Hooker and George Bentham's material between 1853 and 1865. The Library was started by the gift from Dr. W. A. Blomfield and is housed in Hunter House, Kew Green, the former residence of the King of Hanover, and which was granted by Queen Victoria for the purpose of the Library. One wing was added in 1877, and the second in 1902, leaving the Library in the original Hunter House.

Herbarium material is preserved by drying, but this is unsatisfactory with cacti and a number of Mammillarias were exhibited to illustrate how the drying process destroys the shape, markings, etc. A collection preserved in spirit is now being built up.

Kew material includes nearly all the *Mesembryanthema*, *Stapelieae*, *Euphorbieae*, etc. described by N. E. Brown numbering over 1,000. Types and authentic specimens of the early Cape collectors (Drege, Ecklon, Zeyher, etc.) are also preserved at Kew, together with large numbers of Haworth's plants.

The Herbarium contains many types of cacti and succulents described by early authors, but, in recent years, these plants have been neglected by British authors and, in consequence, the collection has not increased. This is probably due to the difficulty encountered in preserving study material, but it is also due to the lack of specialisation here.

In addition to preserved specimens, there is a very large collection of original drawings and photographs of succulent plants, including pencil sketches by authors who have worked at Kew, or who corresponded with Bentham and Hooker.

Among many old books in the Library, we were privileged to view the earliest MSS in the possession of Kew, that is, the "Herbarius zu Teutsch," popularly known as "Ortus Sanitatis," Mainz, 1485. It is difficult to read as it dates before the days of print.

Thoughtful and with greater understanding, the party passed to the propagating houses where Miss E. Ferguson Kelly, recently returned after a stormy crossing from Eire, valiantly undertook the task of showing us round. Again we were surprised at the scope and freshness of the Kew collection. Few had visited these houses before, having been confined to the houses in the open grounds. The plants here caught and retained the eye and, to ourselves, interested in the plants, they presented a fine study and we found the time all too short to appreciate fully what was shown us. Most of us mentally, some verbally, decided to come again and spend more time with those plants in which we were interested. Miss Kelly, direct in the Irish way, was interesting, humorous and full of information.

Kew has a vast collection of cacti and succulents, numbering approximately 4,000 plants. Several of the large specimens, especially *Euphorbias*, are, at least, 100 years old. There is a fine specimen of *Hechtia argentea*, a native of Mexico, probably the finest plant in cultivation. It flowers annually, but never produces seed.

Cactus House, No. 5, was built in 1855, rebuilt in 1905 on the original foundations when several structural alterations were made to improve the conditions for the plants. It is 200 feet long, 30 feet wide and 20 feet high.

The Sherman Hoyt House was presented to the Gardens by Mrs. Sherman Hoyt of Pasadena, California, with a large number of cacti and other S.W. U.S.A. plants, as well as the painted background of the Moham Desert, after she had exhibited them at the Chelsea Show in May 1929.

The South African Succulent House was erected in 1935 by the generosity of private donors. It contains a large collection of Karoo plants, arranged to show, as near as possible, the conditions in which they naturally live.

After 3½ hours, the visit terminated in rain, but the visit was highly successful and will be remembered for years to come.

Thanks are due to Mr. Sandwith and Miss E. Ferguson Kelly for the very efficient way in which the visit was conducted. Thanks are also due to the Director, the Curator and the Keeper of the Herbarium for permitting and making the visit possible.

THE EXHIBITION 1946

R.H.S. Hall, September 10th and 11th

So our first post-war exhibition is over!

Considering that members have lost so much, it was a very successful representation of our plants.

Many others were evacuated and their plants dispersed or lost. Others unfortunately lost their collections through bomb damage and blast. Others, due to the war effort, just had to neglect their plants. Many of us undertook civil defence and other kinds of war time duties and the time involved prevented us from attending to our plants as we would have wished. Even a greater factor was that war time restrictions prevented the use of fuel in our greenhouses, and frost, plus neglect, took their toll. It is now learned that some collectors were fortunate to be able to get a supply of fuel, but others had recourse to all kinds of subterfuges to save their collections; we hear of one who, because of his calling, was able to obtain a fuel allowance for his studio. This gave him the opportunity of moving his plants into the warmth and, of course, his plants are in perfect condition. However, the plants exhibited provided evidence that either members took exceptional care with them or were successful in their subterfuges, for the plants were fine and in good condition. Perhaps, it is a tribute to our plants for they so frequently put up with the most negligent treatment!

The exhibit created a great deal of interest and many enquiries were recorded and dealt with. The Press, too, was interested and a daily paper gave a good report and, according to information we have received, one of the picture papers took photographs and apparently an article will appear in due course. Unfortunately, our own photographer disappointed us so that we are unable to reproduce a picture of the exhibition.

The Society and its members can be congratulated upon a fine continuity of our post war efforts and we should be satisfied that the exhibition has served its purpose in creating and maintaining interest in our subject. It is events like this that draw the attention of the multitude to our plants and we all know that it means that many people become interested and add strength to our work.

We have not mentioned the difficulty or impossibility of importing plants so that, with very few exceptions, all the plants shown must have been of pre-war vintage. There were not many large specimen plants, but the general trend of the exhibits was good condition and fine appearance.

The prize winners were:—

Class 1. Three *Echinocacti*. 1, Miss D. M. Poore; 2, Mr. H. Aylott.

Class 2. Three *Mammillarias*. 1, Mr. E. Shurly; 2, Mr. K. H. Walden; 3, Mr. J. Bagley.

Class 3. Three *Cereus*. No First. 2, Miss D. M. Poore; 3, Mr. H. J. Aylott.

Class 4. Three *Echinocereus*. No First. 2, Mr. H. J. Aylott.

Class 5. Three *Echinopsis* (including *Lobivias*, *Rebutias*). 1, Mr. H. J. Aylott.

Class 6. Three Cacti not scheduled in classes 1-5. 1, Miss H. Mackenzie.

Class 7. One specimen Cactus or Succulent. 1, Mr. H. J. Aylott; 2, Miss D. M. Poore; 3, Mr. H. N. Judd.

Class 8. Cacti raised from seed by Exhibitor (under two years old). 1, Mr. H. J. Aylott; 2, Mr. P. V. Collings; 3, Mrs. S. J. Cutler.

Class 9. Cacti raised from seed by Exhibitor (over two years old). 1, Mr. K. H. Walden; 2, Mr. J. Bagley; 3, Miss D. M. Poore.

Class 10. A Miniature Garden. 1, Mr. D. R. Cochrane; 2, Mr. H. N. Judd; 3, Mr. H. J. Aylott.

Class 11. Three *Mesembryanthemums*. 1, Mr. P. V. Collings.

Class 12. Three *Haworthias*, *Gasterias* or *Faucarias*. 1, Miss H. Mackenzie; 2, Mr. H. J. Aylott; 3, Miss D. M. Poore.

Class 13. Three *Euphorbias*. 1, Mr. H. J. Aylott.

Class 14. Three Succulents not scheduled in classes 11-13. 1, Mr. H. J. Aylott; 2, Miss D. M. Poore.

Classes were confined to three specimens in recognition of war time losses which might make larger numbers difficult for entrants.

The judge was Mr. A. Boarder, and Mr. K. H. Walden was in charge of the exhibit throughout the two days. The thanks of members are due to both these gentlemen for the very efficient way they discharged their different tasks.

It remains for us to report that co-incident with the Society's Exhibit, there was a contest, under the auspices of the Royal Horticultural Society, for the Sherman Hoyt Trophy which was won, for the eighth year in succession, by our Chairman, Mr. P. V. Collings. The runner-up, Mr. H. J. Aylott was awarded the Banksian Medal.

HUNTING FOR CACTUS IN MEXICO

By F. SCHWARZ

A romantic account that will give the reader some idea of the difficulties encountered in finding his plants.

Our old Ford, proved companion of many trips, stands at the door completely filled with foodstuffs, cans with water, gas and oil, sacks, balls of twine, wrapping paper, shovel, pick and other kinds of tools for the trip.

In the back seat of the car, peeping sleepily from behind the bundles and half covered by them, sits our peon ; his face shows that he considers it far too early to start out ; daylight is still to come and the sun is still somewhere behind the mountains.

My friend and companion appears at the door, rifle in hand, and we can now start. That, at least, is our intention, but our Ford seems to have ideas of its own, and for quite a time our Ford wins. I sit on a stone exhausted from so much cranking ; my friend has practically disappeared under the bonnet of the car trying to find new combinations, to connect up the cables, to replace sparking plugs and only from time to time his hollow voice is to be heard, "Crank her again." Suddenly, a loud explosion and the motor is running, and after a few minutes to let it warm up we are on our way to the Sierra de la Paila which, high, dry and uninhabited, waits for us in the distance.

We have been travelling all day and the sun starts to go down in the west ; we cut our speed and look round for a place in which to spend the night. A rattlesnake crawls slowly over the road and, in the last rays of the sun, we jump out of the car to kill it ; a few yards further on we come across its companion which meets the same fate. Both are well grown specimens, about 130 cms. long, and I am looking forward to skinning them in camp next morning, so, as night is coming on, I tie them up to the headlamps.

A few minutes later we find an even place, without bushes and trees, close to the road, and decide it to be a suitable place at which to camp. The peon comes to life, collects firewood, and a little later we are cooking our meal and stretching our legs after the long trip and finally go to sleep.

The night is clear and not too cold and, just before dawn, I wake and look with a certain envy on my friend who is still peacefully sleeping when, suddenly, my eye catches sight of a snake, coiled head high, with a glint in its eye, just ready to strike at the face of the sleeper.

With a jerk I pull my friend over and he comes out of his dreams with not very well selected phraseology, then he sees the rattler and rolls a few more yards on his own account and, with a quick movement, I get up completely. A scorpion rolls out of my blanket while my friend says, "Your little friend is smaller than mine."

Now for the rattlesnake ; it is one of our friends of the evening before, which we believed to be dead, but it had a different opinion and had got away from the headlamp. This time we make quite sure and make a complete job of it.

Around noon we arrive at our goal, Valle de los Parenos, which is a long and lonesome valley more than 45 miles from the nearest habitation. On former trips we have searched the valley for water without finding it, but the presence of deer and an encounter with a brown bear (my friend had, of course, left his famous rifle in camp), told us that water must be in the vicinity.

After lunch we commence our search in the mountains for the beautiful *Echinocereus De Laetii*, as these ranges are its natural habitat.

We remained in the mountains for a week with little success. We had always found the plant here in abundance, but so few were found that we had not enough to make our trip successful. It had never, previously, taken us so long a time to find it. Our water was coming to an end, but we decided to make one more trip to a place we knew of up in the hills, to see if we could complete our collection.

We were fortunate this time in finding the plant in abundance and, finally, we started on the trip back to camp. Under normal conditions, it is difficult enough, with two heavy sacks full of plants, which need the utmost care, to climb down these slopes that divide us from camp, but this time it seemed to be practically impossible. Every minute we became more and more thirsty, and weaker, too ; lack of water made eating a task and finally impossible, and camp seemed to be hundreds of miles away. Finally we come within sight of it, but the exertion of every step seemed to push it farther away.

Our peon is the first to give up. Without any energy to spare we get him on his feet again, and our sad little party moves on.

We have only one idea—water—what little water that might be left in the radiator of the car, still 300 yards to go,—water—200 yards to go—the water in the car ! 100 yards to go, and only the idea of the water in the radiator keeps us going. Finally we get to camp, drop our loads and crawl to the car, only to find, to our dismay, that the key, which releases the water in the radiator, has broken off. With a last effort we get the connecting hose off between the engine and the radiator, and sink back completely discouraged ; not a drop of water. The days, while we had been away, had been very hot and all the liquid had disappeared. A little water was, naturally, left in the engine block, but if we wanted to find our way back to safety that could not be touched.

Crazy and weakened by thirst, we try to maintain our energy and, moving like figures in a slow-motion film, get our camp outfit together, my friend makes three long trips to bring in the peon and his two sacks ; they seem miles away, and the poor peon could not make the last eighty yards, but finally we have everybody and everything together. A silent prayer that the motor will not fail us ; it starts at the first attempt and, in my mind, I bless Mr. Ford.

We are on the way back over a road that seems endless, and after what seems centuries to us, we come to a point where there is still ten more miles to go to find water. Our lips and gums are swollen and parched, tongue and head do not respond any longer, the motor radiates heat like a tremendous fire, my eyes see red everywhere without being able to distinguish anything, but the car, fortunately, goes on.

Suddenly, the world seems to have come to an end ; a terrific bump, and everything stops ; the car has fallen into a hole. After some time I hear a weak voice, far away, that comes from my peon, " Piedra de Lumbre, señor." It takes the mind quite a time to get any sense out of these words, but slowly and yet suddenly the brain makes contact—Piedra de Lumbre means we have found a place with water. It takes our last bit of strength to reach the water hole, but we finally get there, and slowly, with each drop we drink, we come back to life and to normal condition. It surely was a narrow escape.

It seems a game, afterwards, to get the car out of its hole and to drive on a couple of miles until we find a place where we can spend the night. At midnight we finally come to rest. The night is cold, the stars are twinkling down on us ; the moon is up and sends soft light over the plain.

Just before falling to sleep, I hear, far away, the barking of the dogs of the ranch-houses of Piedra de Lumbre. Then this world exists for me no longer and I dream of rivers rushing down the mountains and of tremendous lakes !

We give an illustration in this number of *Mammillaria Twersiana*, a spec nova 1946, received from a helper at the establishment of Ferd. Schmolz of whom we only know the initials " R.S." Owing to prevailing restrictions, we are unable to obtain the plant and describe it, but we hope time will remedy this. It is, however, our first post-war publication of an illustration of a new species.

Mr. W. Denton was omitted as a member of the Council last month. Further, Mr. Denton has been awarded the B.E.M. Congratulations and apologies, Mr. Denton. A further omission was Captain H. J. Dunne Cooke, the well known collector and authority on mimicry *Mesembryanthemums*. Miss E. Ferguson Kelly was appointed to the Council at its last meeting.

GERMINATION OF CACTI SEEDS

A Lecture by A. BOARDER, Royal Horticultural Society Hall, 26th March, 1946

I am giving this talk tonight on Raising Cacti from Seed in response to the request of the majority of the members who were present at our first general meeting after the war.

To those who have heard me before I apologise, and hope that they will bear with me for the sake of the beginners, or for those who would like to know more about this fascinating hobby.

The need for raising cacti from seed is more important than ever these days, as it is practically impossible to import any plants. Of course, you may say "Where are we going to get the seed from now?" Well, there is still some in the country, and I am sure that many members must have plenty of seeds on their plants which they could spare to help those less fortunate.

For those that have or can get some seeds the following method should prove successful. First of all the seed should be fresh. Many kinds of cacti seeds will not keep fertile for many years and I have just had a very conclusive proof of this. Having lost all my collection of Mammillarias through the war, I felt I could make a good start again with some 32,000 seeds which I had saved from my plants. Some of these seeds were twelve years old and most were over six. Out of 156 kinds I have only had about 50 kinds germinate, whereas a few seeds given me by a member, which were fresh, have germinated 100 per cent. under the same treatment as my old seeds had. Having procured the seeds the next problem is what is best to sow them in. I find that half pots, four inches in diameter, serve my purpose best. If you have only a few seeds of a kind, you can easily divide the pots with small strips of glass. The only difficulty with this method is that many kinds of seeds may vary in the time they take to germinate, and so one cannot give the necessary air, etc., if there are more kinds than one in each pot. However, this can be overcome by planting different varieties of a species in the same pot, as these will probably germinate in the same time. The pots should be well cleaned and sterilised with a solution of permanganate of potash.

The soil mixture is most important and the mixture as advised by the John Innes Institute will be found excellent. It is as follows:—2 parts by loose bulk of loam; 1 part ditto peat; 1 part ditto coarse sand; to each bushel of the whole mix $\frac{3}{4}$ oz. ground chalk or limestone and $1\frac{1}{2}$ oz. of superphosphate. The quantities should be measured and the fertilisers weighed. The amount to be mixed should be calculated beforehand so that the fertilisers can be mixed with the sand. If the loam is sandy, use a little more of it and take the same amount off the sand.

This mixture should be sifted through a fine sieve, I use one made by nailing a piece of perforated zinc on the base of the sides of a box. Use the coarse part to place over the drainage crocks which you have placed in the base of the pots; charcoal is best for crocks. Fill up to within about an inch of the top with the coarse mixture and then fill up to the brim with the fine compost. Scrape off level with a piece of wood. The seed should then be sown finely on the top. Try to keep the seeds apart if possible. Now press gently down on the seeds and soil with anything which has a smooth, level surface. You will find that the mixture will go down about half an inch. No soil should be placed over the seeds, as they will germinate better if they are not buried deeply.

Now place the pots in a tray and run water in up to about three quarters the height of the pots and leave until the mixture is well moistened. After this they should be placed in a frame which can be kept at a temperature of about 70 degrees. This can be done whichever way is most convenient. Electric heating is the best as this can be regulated by means of a thermostat, and is very clean and without smell. The pots should be covered by a small piece of glass; a separate piece of glass should be used for each pot.

The majority of seeds should germinate in about a week to a fortnight under these conditions. Some may do so in five days, whilst others may take some days longer. The frame, or the pieces of glass, should be shaded from direct sun, as the tiny seedlings cannot stand the strong rays of the sun at any time during their early days.

When the seedlings appear the glass may be raised slightly to admit more air. I find that a small loop of wire hung over the side of the pot will suffice. If the mixture is fairly sweet there should be no damping off of the

seedlings, and a sprinkling of *Limax* on the top of the soil will prevent this. If the soil is sterilised before sowing, care must be taken, as if this is carried too far there will be no useful bacteria left in the mixture as well as the harmful ones.

Care must be taken to see that the pots do not get dry at any time during the germination, but also you must not soak them too much or the mixture will go sour.

Some growers recommend an early transplanting of the seedlings, but I find that as long as all appears to be going well I do not believe in moving them until they have some spines and, in fact, cacti in miniature, and not just green balls or the cotyledon stage. They do not seem to mind being crowded, and very often they do better like this. Perhaps they like company.

Seeds may be sown at any time of the year when the temperature of 70 degrees can be maintained. Early Spring is the best time for most growers as the plants are a better size to enable them to go through the following Winter.

When the seedlings are transplanted they may be placed in boxes or large seed pans. I do not think that there is any useful purpose served by using tiny flower pots. Anything under two inches in diameter is useless. Use a mixture with more loam in for the next shift and also incorporate a little bone meal or hoof and horn grist. Always be careful to shade from strong sunlight, and water with great care. Nothing will grow for long if waterlogged, so only water when necessary, and watch each individual pot or pan.

By using this method and providing the seed is fresh there is no reason why success should not be achieved.

Several questions were asked after the talk, and the advice was given that when no seeds appeared to germinate, if the surface is slightly stirred some seeds which may have been too deep will often germinate, even after a considerable period.

In answer to a further question it was said that several kinds had been flowered within a year of sowing the seed and nice sized plants of many species could be raised within a couple of years.

In conclusion it may be asserted that cacti may be raised from seed in this country to equal any plants imported from abroad.

We have had the pleasure of a visit from Miss M. C. Karsten, who has been in Holland throughout the occupation and has shared the privations of that country, and she has promised us a contribution for a forthcoming Journal. The Dutch Society is in difficulties, at the moment, and unable, owing to paper shortage, to recommence their Journal "Succulenta," but are keeping in touch with their members by a sheet headed "Mededeelingen." Another visitor was Mr. J. A. Janse, of the Nederlandsche Vereeniging van Liefhebbers van Cactussen en Vetplanters (Dutch Society of Cactus Amateurs), who attended our last meeting on September 10th. He is the secretary of his Society.

Two years ago, I grafted a small piece of *Aporocactus flagelliformis* on to a *Selenicereus grandiflorus*. In twelve months it had made twelve inches growth and looked like a whip, so the growing tip was cut off in order that it might branch out. It made three new growths by the spring of this year, when, through an accident, another pot plant fell on top of it, breaking the growth off at the junction of the graft. The "rats' tail" was inserted in another pot to make its own roots where it remained for four months; it made no roots, but a bud developed at the point where the three new growths commenced. The flower completed growth. The plant from which the cutting was taken is about six years old and has not flowered. I am wondering whether it was the grafting of the cutting or the stopping of the shoot that caused it to flower and shall try both methods this year and await results.—K. H. WALDEN.

On page 51 of our last number, the description of a "perfect" flower was incorrect, rightly pointed out by correspondents. A "perfect" flower is one which has stamens and pistils.

SUCCULENTS

Descriptive and Cultural—covering a wide range

By G. G. GREEN

Most collectors of cacti include a few, if not more, succulents amongst their collections, some giving them pride of place in the greenhouse, while others are apt to use them, grudgingly, to "fill up."

Though I am fortunate in having a thousand or so cacti of a great many genera and species, I have an equal attraction for the other families of succulents which, in my opinion, are more beautiful in every way than the greater part of their brothers, the true cacti.

Not only do they flower more profusely and of longer duration than cacti, but they are always attractive and constantly showing new and interesting sidelights in their growth. Winter and summer, each has its own group of plants which flower and grow in these seasons.

The bleak, cold days of winter are astonishingly brightened by the colourful blooms and appearance of the winter-growing succulents, and no other family of plant life can give such fresh, lovely and colourful blooms when the skies above are grey and cold. In summer, succulents excel themselves and, coupled with the beauty of their foliage, the blooms give unlimited satisfaction.

Of course, not all succulents are beautiful, either in flower or foliage, and it is my intention to give details of those particular species and varieties which, I think, are without peer in colour or beauty of construction, and which if grown, as will be suggested, will offer that continuity of bloom and beauty of foliage throughout the year that is so often absent in a collection of cacti.

Most succulents are easy to grow and profuse in their reproduction, though, as always, the more beautiful the plant, the rarer it is, owing, either to lack of offshoots or its reluctance to seed. However, I think I can safely say that I have successfully grown, in quantity, most of the succulents that will be described here, and will give all the cultural details, that I have acquired, with each description.

My first choice in the large family of succulents is a family that, for brightness and beauty of their foliage, can hardly be surpassed, though they are by no means the choicest,—the *Echeverias*.

This is a large family indeed, and has been split up into many different genera, each with its distinctive difference. They are mostly of rosette shape, bearing racemes of brightly coloured, bell-shaped flowers, in profusion, in early spring, summer and autumn.

The foliage is thick, waxy, multi-coloured in the various species, and sometimes covered with a white meal or "bloom," or sparkling with a crystalline sheen. All are beautiful in form, texture of the leaves and brightness of the flowers.

From the half-hardy bedding varieties, which every garden and park knows, to the more delicate types which need glass protection all the year round, they are easy to grow, liking a sandy or gritty loam soil containing a liberal quantity of leaf-mould with broken charcoal and a little cow manure mixed in. Most types prefer a little shade, but sunlight brings out all their delicate tone colours, and they are very adaptable as long as water is given freely during the hot months.

First on my list, for beauty of foliage and flowers, are the following species, the true *Echeverias*.

E. carnicolor. A beautiful plant with glaucous, flesh coloured foliage and crystalline sheen that sparkles and glints in the sunlight. Rosette shaped, its flowers are bright red and orange tipped, appearing in January and March. Rather more leaf-mould can be incorporated in the soil mixture.

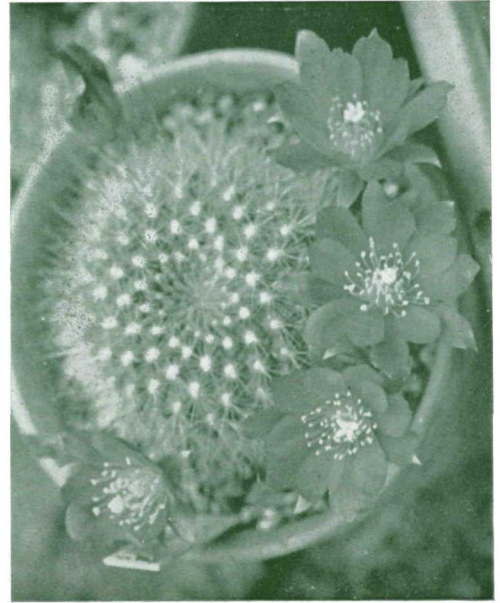
E. Desmetiana. Sometimes called *E. peacockii*, this plant is covered with a white meal or "bloom," and has elongated, pointed leaves that cluster thickly around the stem. Its orange and red flowers are produced in early June on long stalks. The soil should be gritty and the pot used should be slightly wider than the plant at the brim, as the leaves are so closely packed round the base that watering is difficult when a smaller pot is used.

continued on page 87



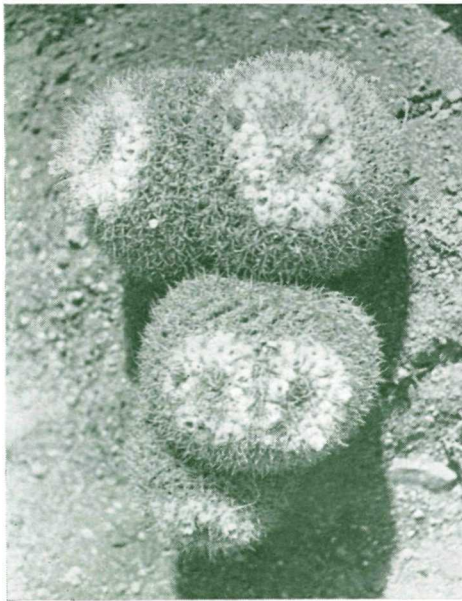
Rebutia Haagei var *Chamaelon*

A. V. Fric

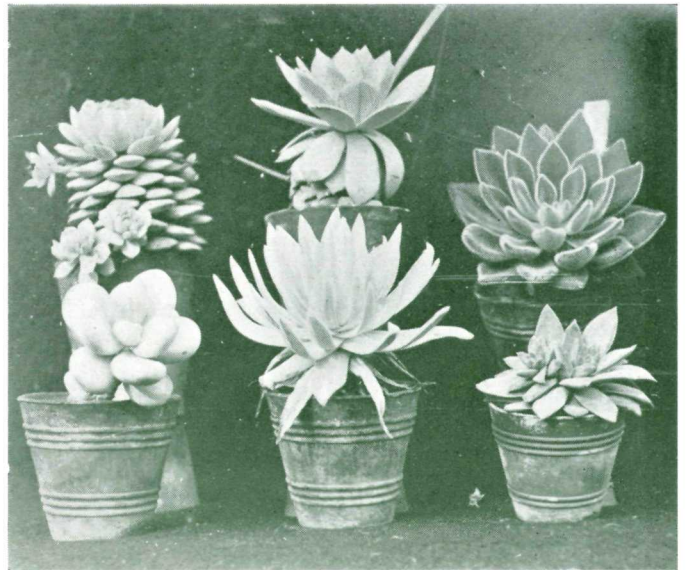


Rebutia Fiebrigii

V. Stansfield



Mammillaria Twersiana Spec. Nov., 1946
"R.S." Schmoll



E. Elegans.

E. Desmetiana (Peacockii).

E. Pulvinata.

Pachyphytum Oviferum.

E. Carnicolor.

Dudleya Farinosa



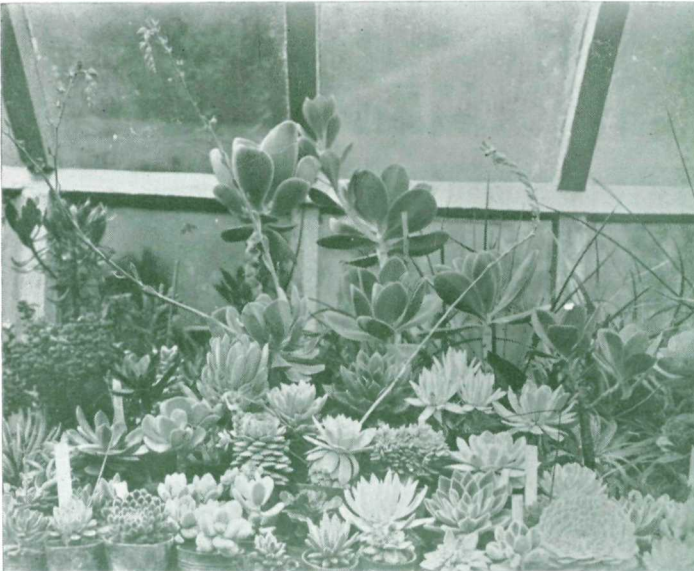
Aloe Plicatilis

G. Lamb



Tresco Abbey Gardens, Scillies

J. Gibson



E. Gibbiflora var *Metallica*
in background

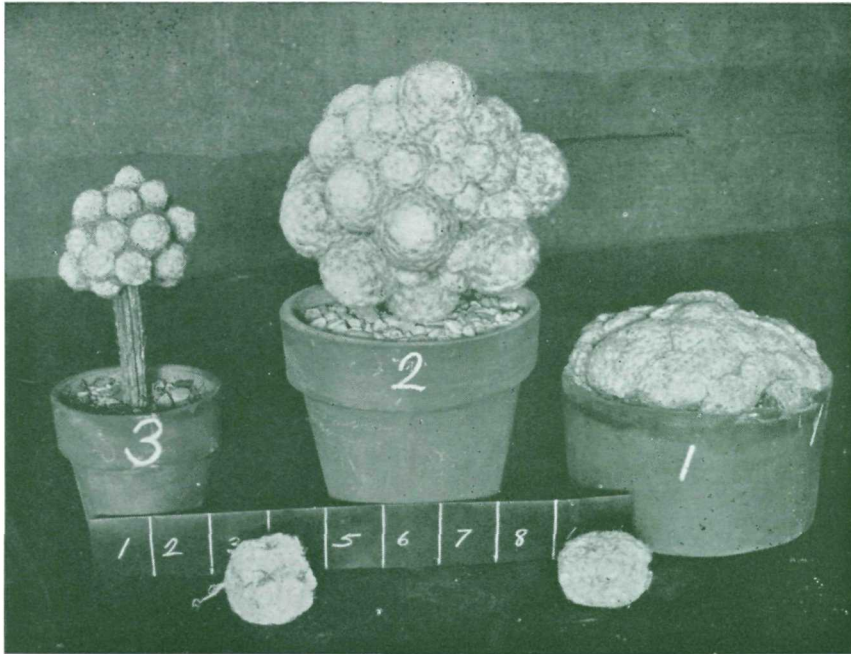
Pachyphytum, *Dudleyas* and *Urbinas*
in front

G. Green



Echinocereus de Laetii

F. Schwarz



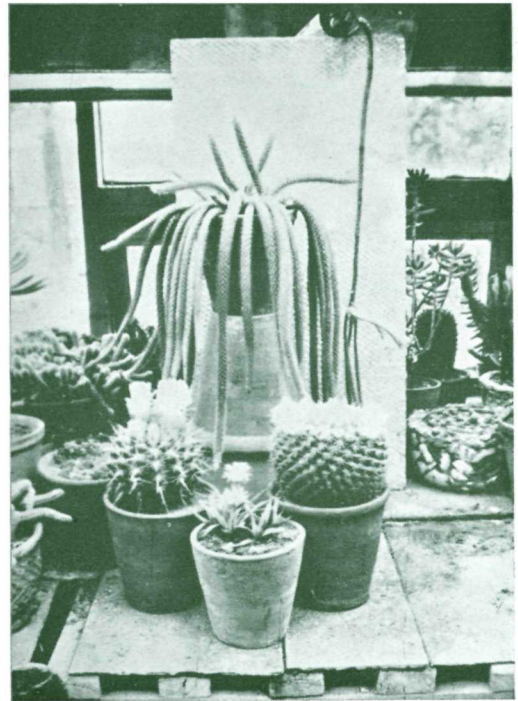
Mammillaria Plumosa

C. W. Armstrong



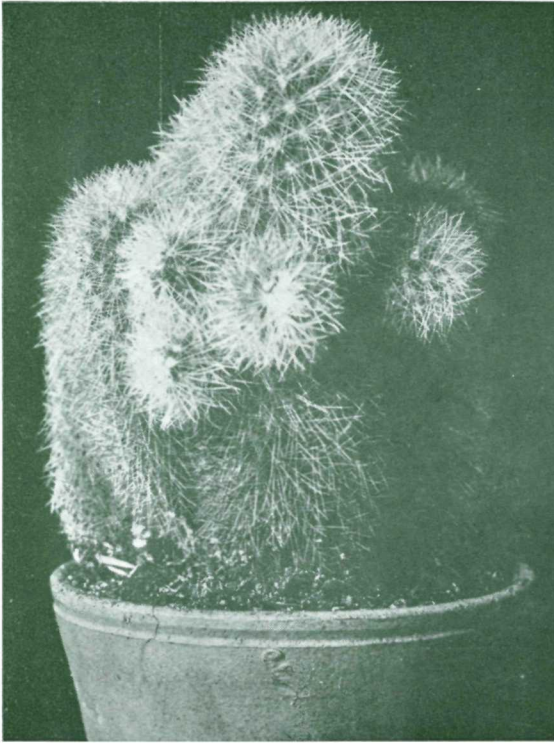
Mammillaria Hahniana

H. Winter



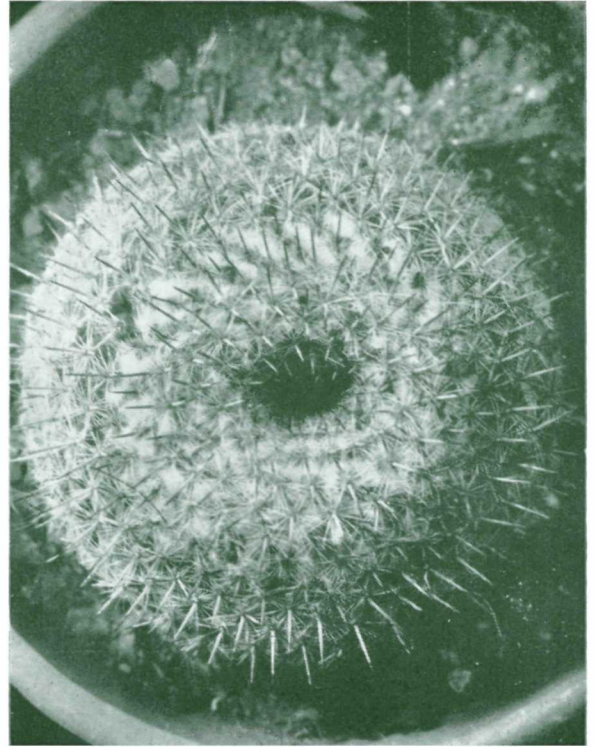
Aporocactus Flagelliformis

K. H. Walden



Mammillaria Mieheana

Schmoll



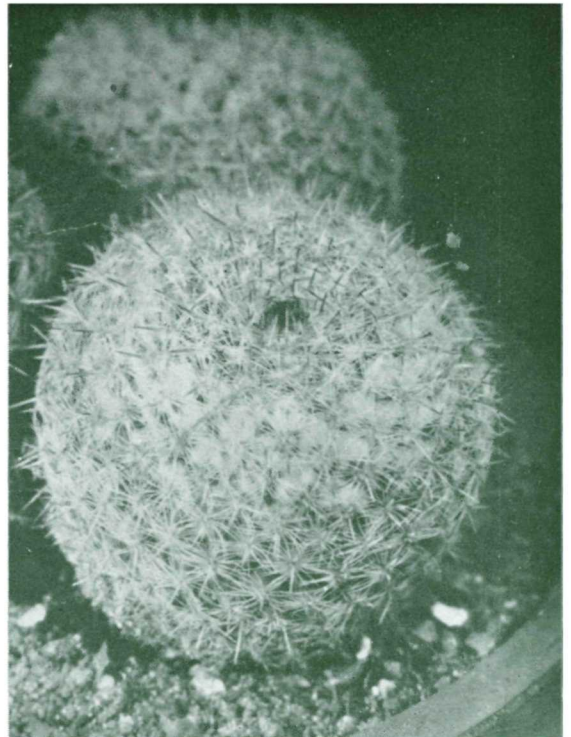
Mammillaria Queredoi

Schmoll



Mammillaria Werdermannii

Schmoll



Mammillaria Bravoae

Schmoll

continued from page 82

E. gibbiflora and *E. gibbiflora* var *metallica* are two indispensable plants to a collection as, growing larger, they have such beautiful colouring, the variety *metallica* being especially noticeable with its red leaves and bluish, steel-like sheen. They both flower for longer periods, sometimes from March to August, sending up numbers of long racemes of reddish coloured bells.

E. multicaulis var *globosa*. This variety has remarkable foliage, the tinting ranging from green to red and orange. It is a bushy plant of small rosettes, the leaves being highly polished. A real gem.

E. elegans. Small rosettes which grow elongated and send out offshoots from the most unlikely places. It is pearly white with a dusting of white meal, the flowers being orange-yellow in early summer.

E. per-elegans. Larger than the last and with broader leaves, which are bluntly pointed, covered with white meal and semi-transparent at the tip. The flowers are orange-yellow, in May and June. This plant also requires a larger pot than usual because of the densely packed leaves.

E. pulvinata. A showy, hairy leaved variety with a velvety dark green body and lovely, large reddish orange flowers in June.

E. leucotricha. Similar to *E. pulvinata*, but smaller and rather better looking, the hairy leaves being fatter and more silky with its downy hairs.

The last four species are placed by some authorities under the *Globosa* genera. Others in the same group which are well worth growing are *E. fulgens*, *E. glauca*, *E. amoena* and *E. atropurpurea*, a dark red leaved species with reddish pink flowers, orange tipped.

Next to the *Echeverias* come the *Dudleyas*. These are very similar to the *Echeverias*, having grey rosettes, sometimes covered with a white meal.

It is most confusing for the average collector to find that of two plants which look very similar, one is placed in one genera and the other in a different one. I can appreciate the difficulty in classifying such plants, but unless one is to resort to highly technical language of an advanced botanical nature, there can be no definite rule to lay down.

However, *Dudleyas* usually have leaves that are narrower than those of the true *Echeverias*, and are of **even width** from about the middle to the base, a point that is well worth noting, for I do not think there is one species of true *Echeverias* that is not narrower at the point than at the middle of its leaves.

I have followed this rule, if so it can be named, and have been highly satisfied in finding that, after closer study, my first decision was correct, though, as I have stated, it is not infallible.

The following represent the genera fairly well and are, in my opinion, the best of this group.

D. pulverulenta. White-mealy, with reddish flowers in summer.

D. farinosa. Better known as *Echeveria farinosa*, a beautiful white-meal covered plant with long, pointed leaves.

D. caespitosa. A variegated pink and white leaved species with reddish flowers—lovely and always attractive.

The *Dudleyas* require to be separated from the centre in order to propagate, as they hardly ever send out offshoots. This can be done by pinching out the growing centre, when the plant will soon grow several new "heads," which can be cut off and rooted if desired.

(To be continued)

I note Major Smiley's experience with D.D.T. Evidently he used one of the household liquid sprays which are made up with a petroleum derivative base and should not be used on plants. We are getting (in U.S.A.) both liquid sprays and wettable powders for use in spraying plants. I have used both types this summer and they seem to be effective. They surely are controlling thrips. I examined some plants in the fields that were heavily infested with spine mealy bug before being sprayed twice with D.D.T. and Volck mixed. I could not find any live ones though it will be a miracle if some did not escape to produce a new crop.—HOWARD E. GATES.

A VISIT TO S.W. CORNWALL AND THE SCILLIES

WHERE CACTI AND SUCCULENTS GROW IN THE OPEN AIR

Our first call was Penzance, a resort famous for its palms and other sub-tropical growth.

The first contact was Mr. Gandy, of 6 Marine Terrace, who has a small collection of cacti and succulents growing in the open. The selection is not wide, but was remarkable for the fine condition of the plants. They were green throughout their growth and showed evidence of the care their owner bestowed upon them, as well as the kindly climate in which they live. They are out all through the year except only for stormy weather in the winter. They do have storms there notwithstanding the Riviera climate. When they have storms, they have waves breaking completely over the promenade, the houses, and over into the gardens at the back. Their front gardens, Mr. Gandy's is on the promenade, are under two feet of water in these storms so that plants kept permanently outside have to contend with severe conditions occasionally. One of these is a big *Agave americana variegata*, which is eight feet wide and five feet six inches high. It is 48 years old and its owner expects it to bloom soon. Another that died after flowering, as usual, had a flowering stem twenty-six feet high and the main stem was eight inches across. An ordinary *Agave americana* that flowered and died a year or two ago, close by, had a flower stem thirty feet high with leaves six feet long! Mr. Gandy has a *Cereus serpentinus* (?) growing in the open five feet six inches high in perfect condition. *Rebutia minuscula* with over eighty heads. Fine plants of *Haworthia*, and *Opuntia microdasys*, received as *albescens*, and a *Gasteria* with over twenty heads, the plant being in full bloom. An *Echinopsis*, believed to be *oxygona*, was in bloom with three fine, large white blooms with plenty of buds nearing the opening stage. During the violent winter storms, the water thrashes all the goodness out of the soil, which, having a very liberal admixture of sand, becomes rather lacking in nourishment.

In Penzance and surrounding country, three kinds of *Mesembryanthemums* grow wild and form mats covering the ground, hedges and walls perfectly and when in bloom, they were while we were there, they are a sight that cannot be forgotten. *Aloes*, *Agaves* and *Rhodostachys* are genera that obviously do well there in the open and *Gazania* are prolific in growth and flower.

We made a visit to the Morrab Gardens and were rewarded in finding a wealth of succulent material, but rather restricted in genera. The *Agaves* there were fully as large as that detailed at Mr. Gandy's. *Rhodostachys* were everywhere. These gardens are justifiably famous throughout the world and, once seen, it can be understood how they get their fame. We met Mr. William E. C. Daniel Watson, the further initials are necessary to differentiate between the famous William Watsons that loom so largely in English cacti and succulent history. He is a Scotsman, Cornish born, with all the characteristics of his two "homes." His gardens are a picture and are worthy of the reputation he has gained for himself and for the gardens. We left him pondering the answer to our question as to whether he was "parks superintendent" or "head gardener"? Our visit was enjoyable, Mr. Watson as well as the plants under his care.

From Penzance we went to the Scillies with the express intention of visiting Tresco. We had the very kind invitation of Major A. Dorrien-Smith, one of our members, to visit his gardens, with an introduction to his head gardener, Mr. G. Andrews. Unfortunately, the Major, as he is known throughout the Islands, we could not see as he was enjoying his holiday in London (!), but we found that the tender mercies of Mr. Andrews was an enjoyable experience. He knows our subject and he has to know the whole of botany with a special inclination towards sub-tropical plants which form the major portion of the inhabitants of the garden of Tresco Abbey. Everywhere, we had ample evidence of the most careful treatment, and, in addition to visual emotions, we had his very lucid, very informative and extremely clear expositions. We were fore-warned that owing to lack of staff, we should find rather a shambles, that is how we expected to find it. Seeing the state of our garden, on our return after three weeks away, well—we wish we had the shambles! Lack of staff is, of course, a real trouble, but there was not the slightest trace of a shambles, and we found the gardens in fine condition and it would be a difficult man who found fault.

Tresco Abbey Gardens do not have many true cacti, but the selection of succulents is wide and beautiful. Mr. Andrews showed us over the greenhouses which contained both cacti and succulents, but the beauty of the collection of plants is in the open. In the greenhouses, one common plant drew our attention, *Mammillaria pusilla* (we give the name by which it was received), because of the unusual width of the separate heads which were over two inches across.

In the open gardens there was a wealth of material on which to work, and it would need months of time and a book in which to contain everything of interest in regard to succulents. To mention a few, *Aloe arborescens* eight inches across single heads, clumps grow up to several feet across, *Agave americana* ten feet wide, five to six feet high, leaves eighteen inches across, *Dasylyrion* three feet across, *Opuntias* five feet high, with pads six inches in diameter, *Aeonium canariensis* with heads twelve to fifteen inches in diameter, *Fourcroyas* four feet across, bewildering masses of many different species of *Mesembryanthemus*, shrubby kinds, which obviously do so very well in the islands, *Crassulas* of many kinds and sizes, *Puyas*, with flower stems, mounting to five feet in height with green bell shaped flowers and orange anthers, a glorious sight; *Glottiphyllums* in profusion; a plant that took our special attention was *Aloe plicatilis* whose fifteen to eighteen inches long leaves have strong red colouring although the inner, unopened leaves were green with only the slightest trace of red. Another plant that rather staggered us was *Aloe Broomii* which was just like a bunch of bananas reaching up into the air, not staggered or alternated in their growth, but layered on each other on each side of the centre. Such an unusual growth for an *Aloe* was surprising.

We have given our emotions, incoherent as they may seem to be, but when you are visiting gardens that take half an hour for a straightforward walk, without stops for examination, then you can get some idea of the extent and the profusion with which we were met. Major A. Dorrien-Smith has, out of his generosity, provided for visitors a vista that can be enjoyed without charge and has rendered a service to all those interested, that it would be impossible to evaluate. The gardens must give him pride and pleasure and are well worth the trouble and expense involved.

Unfortunately, owing to the dearth of photographic materials, it was impossible to get films for our cameras and we found that the island shops had sold out of views of Tresco, so that the accompanying illustration was the only one obtainable. They give only a pallid idea of the glories we enjoyed, and we can only hope, in better times, to be able to do the gardens justice. Those of our members who can spare the time, in their holidays, to visit Tresco will enjoy an experience that cannot be repeated anywhere else in Britain. We tender our thanks and appreciation to our member, Major A. Dorrien-Smith, for the fact of his gardens and for his generosity and courtesy, and we must add to that our thanks and appreciation to Mr. G. Andrews.

Tresco, apart from the Abbey, is well worth seeing for shrubby *Mesembryanthemums* find it a healthy growing place, and when they are in full bloom, matted as they are over walls, cliffs, hedges and everywhere, they give a multiplicity of colour that really staggers when one is used to the small plants seen in our collections. The plants flower so fully that the mats of flowers are larger than the plants, and by mats we mean the word in its fullest description. They grow in Cornwall and some parts of Devon in open also, but we have never seen them flourishing so well as in the Scillies.

Members interested in *Haworthias* and *Apicras* can exchange plants with Mr. J. W. Dodson, 2012 St. Francis Way, San Mateo County, California, U.S.A. Send Mr. Dodson a list of your available plants and he will reply with his list from which you can choose.

Members wishing to obtain back numbers of the Journal, can obtain them from the Editor at 3/- per copy. The first volume and a few single parts are no longer obtainable.

By supporting advertisers you are making more sure the continuance of the Journal, which should always be mentioned in applications. The Journal is of as much value to them as to you. Advertisers supporting us in these days of restricted stocks should be remembered in the coming days of competition.

REPORTS OF MEETINGS

July 16th, 1946. Mr. S. J. PULLEN gave a highly successful lecture on Grafting.

His first point was that plants should not be grafted for the sake of novelty, but to improve the grafted plant. Some plants benefit in growth and flowering when grafted, such as *CC. Sylvestris*, *flagelliformis*, the latter of which has been grown with tails nearly a yard long and bloomed and set fruit. *Cereus Spachianus* lends itself to grafting and was used largely by Germans as stocks.

Ugliness should be avoided. Symmetry must be considered. Rot must be avoided and a good plan is to use an inverted pot with the bottom carefully knocked off and then the plant kept dry.

The stock should be well rooted and about the same age as the plant to be grafted, and also about the same size. It should be nicely matured and not woody.

There must be affinity between the graft and the stock, such as *Epiphyllums* and *Opuntias*, but *Pereskias* take too much out of *Opuntias*. Lack of affinity means that the graft will not adhere and failure will result.

The elements of success are cleanliness, speed of operation. Bind them together with raffia for preference. Rubber rings put pressure on the plants which is undesirable. Another method used by the lecturer was the insertion of straight, strong spines through both stock and graft, which, with the binder, secure the edges together.

The graft faces of both the graft and the stock should match so that they completely adhere. When the graft is matched, and throughout the operation, do not put in the sun, but in shade, as the heat of the sun causes the cut surfaces to dry and shrivel and, in that condition, they will not adhere.

Soil mixture for grafted plants is advised to be one eighth chippings mixed well with loam, charcoal, sand, mortar rubble. For *Epiphyllums* the lecturer suggested 50 per cent. loam or leaf mould, which mixture is advisable for "leafy" cacti such as *Phyllocacti*, *Rhipsalis*, *Pereskias*, etc.

Plants with milky sap will not graft with those with watery sap.

Drainage on the top is advisable for globular plants. *Lobivias* and *Rebutias* benefit from grafting as it promotes their flowering. *Hoodias* can be grafted on *Stapelias* and do well for three years, but it has been generally found that they die after that period.

The subject of the lecture was well discussed by those present and many interesting points were brought out. Emphasis was given to the point that grafting should not be undertaken for the sake of grafting. The operation should never take place unless some very definite object is to be gained and should not be attempted unless the plants do not root, will not grow readily or will not flower. Plants that do well on their own roots should be left to natural conditions and not grafted.

In answer to a question, the lecturer stated that he had never found that the stock and its constitution affected the graft in any way and that no change took place in the salient features of the plant grafted nor did it affect the colours of the flowers.

The lecturer stated, in answer to another question, that his experience shows that the roots of the grafted plant go through the stock and it frequently happens that the stock shrivels up by reason of being absorbed by the stronger strength of the graft.

Asked as to the reason and advisability of grafting, the lecturer and his hearers developed a reasonable case. It appeared that when a plant found the unnatural conditions in this country prevented its rooting, growth or flowering, that grafting made it possible to draw upon the vitality of the stock, in the manner of a transformer, which enabled the grafted plant to get just that energy necessary to make good the characteristic or need that was missing in the conditions and the fact that the root of the graft did form and passed through the stock showed that the operation enabled the graft to resume functions that without grafting would be impossible.

REPORTS OF MEETINGS

September 10th, 1946. Mr. E. SHURLY on *Mammillarias*.

I wish to address myself to the newcomer and give some idea of the scope of *Mammillarias* without confusing with a welter of scientific material that is only useful to the advanced collector.

Mammillarias should be ideal for the beginner, especially if space is restricted. It is rare to find them larger than six inches high in the elongated types and more than three inches in diameter in the globose types. They present no difficulties in growing and flowering and they put up with an extraordinary amount of neglect, though they respond quicker than most to interested care. They germinate readily from seed, the seedlings grow quickly and their maturer growth is more rapid than most of the other types of *Cacti* and immeasurably faster than the large growing types. Few *Mammillarias* are tardy in flowering and, generally, this lack is due to conditions of their native habitat being either a great deal of sun or sometimes shade. Nearly all flower readily under almost any reasonable conditions and those that are tardy can easily be noted and a few enquiries will indicate whether lack of heat or shade is the cause.

Very frequently I receive requests on how to name plants. This is a very difficult subject to answer as I doubt if there is a single collector in the country or even in America who could identify any plant brought to him. To the beginner with but few plants, it is extremely difficult. The more advanced collector, by comparison with his existing plants, can place a plant reasonably near and reference to books will shorten his search for identification. At the same time, the beginner can adopt methods of restricting the tedium of research by understanding a little of their general characteristics.

Mammillarias can be placed in sections. There are the open types that have comparatively few spines and the tubercles are seen clearly. This class can be divided into those with large tubercles, such as *M. magnimamma* and *M. centricirra* (these are two separate species, the first with red flowers and the latter with yellow flowers) and others, such as *M. sempervivi* and *M. Zuccariniana*, with small, compact tubercles. Then comes those more heavily spined so that the tubercles are only partially seen such as *M. mystax* and *M. Brandegeei*. Usually the spines are much longer in these sections.

Then there is a section with spines so heavily covering the plant that either the tubercles are not seen or are simply visible under a heavy veil of spines and it will be found that the colouring of the spines, overshadowing the colour of the tubercle, can be classed under white, such as *M. Parkinsonii* and *M. geminispinga*, or yellow, such as *M. rhodantha* and *M. Vaupelii* (varieties of the latter frequently have an admixture of red or brown).

Lastly, in the straight spined section come plants that are also very heavily spined, but of an entirely different category because of their soft spines, such as *MM. plumosa*, *Herrerae* and *cephalophora* (*M. aureilanata*), *Hahniana*.

The last section of all are those plants with hooked spines, such as *M. Wildiana* and *M. glochidiata*. These need no description as the hooks obviously class them together.

By these sub-divisions the beginner can collate his plants so that they look better and they narrow his search for identification and they will also give him ideas on the evolution and habits of *Mammillarias*.

Generally speaking, the open type of plant, in nature, grows in a certain amount of shade and is subject to normal rainfall and moisture. The gradual increasing of the spine covering indicates a plant with increased exposure to sun until we get the completely spine covered plant that is subject to the hottest sun and arid conditions. The hooked spine section is represented by plants with various depths of spine covering, but the presence of the hook indicates very arid natural conditions, and the depth of spine covering indicates the varying degrees of sun and heat to which it is exposed. Spines serve the further purpose of water conservation. The open types have spines longer and more outwardly spreading so that the plant gets only sufficient rain. The more covered plants do not, usually, have long spines, and their conformation is such that all possible moisture is brought to the roots. It will also be found that open plants, generally speaking, have non-tap roots, while the covered plants have tap roots.

Cacti are not always desert plants, they grow frequently in shade among other vegetation. They grow in good soil as well as in sun dried, arid deserts.

I trust that this little lecture will help the beginner to identify his plants, will enable him to collate his collection in a more understanding manner and has drawn his attention to certain features that will amply repay investigation on his part and that it has increased his interest in these fascinating plants.

SOME NOTES ON REBUTIAS

By F. S. MATHESON

The actual experience of other growers of plants and their difficulties and successes is always interesting. I trust, therefore, the following notes on some of the *Rebutia* species may be acceptable.

Rebutias were formerly included in the *Echinocacti* and are all small growing species, mostly from the Argentine and other South American States. There is no difficulty in obtaining their very attractive flowers every year. Britton and Rose mention only five species in their "Cactaceae," but considerably more have been added since.

R. minuscula is regarded as the type species. It is easy to grow. The rosy, scarlet flowers develop around the base of the plant body and are soon followed by the fruits which rapidly ripen and burst, so that young seedlings are usually found growing in the soil around the parent plant.

R. Steinmannii. Seed sown in May, 1934; flowers first produced in the summer of 1937. Of a very rich orange colour with the numerous cream stamens encircling the white pistil, the flowers are very attractive. Plants no larger than the top of a thimble throw out one or two flowers in a season. My best result was obtained in 1938 with 14 blooms open at once on a four-year-old plant. Plants are dark bronze green, contrasting well with the richness of the flowers.

R. Spegazziniana. Seed sown in March, 1934; flowered in May and June, 1936. The plants, also bronze green, are somewhat taller and more cylindrical than *R. minuscula* and the flowers are definitely finer, produced from the sides of the plant body at varying heights from the base. Petals are broader and blunter than in *minuscula* and are of a brilliant, deep red, the outer ones inclining to crimson.

R. Marsonerii. I bought a small plant of this species in 1938 and it flowered in the following April. The bud is smooth as in *minuscula*, but the flower is rich golden. The petals are long and pointed, and the blooms last, opening and closing, for a week. Some small offshoots formed on the main plant body, but, so far, no seed has been set, despite the profuse blooming. The body is rounded and depressed, thickly covered with long, yellowish bristles.

R. salmonea. I have two distinct species under this name. One was bought in 1938 and flowered in May, 1940. It resembles *minuscula* both in shape and colour of plant body, but the flowers are definitely salmon tinted. The second I grew from seed sown in January, 1937; first flowered in May, 1939. The plants are very small, of upright, cylindrical shape, about the size of a thimble. Some offshoots have developed. In colour, bronze green—certainly different from the one described above—whilst the flowers are of a pale, salmon rose, and the petals, slightly transparent, have greyish margins. Buds are hairy and show a lovely salmon colour when partly open, the fully opened flower becoming somewhat paler.

R. elegans. Bought in 1938. Its flowers are of a rich, deep orange, very similar to *R. Steinmannii*, but the petals are broader and not so pointed.

R. Einsteinii. Also bought in 1938. A very small species, the plant body being somewhat conical in shape, brownish in colour with sparse short bristles. The flowers, which look as though they may be crimson from the appearance of the hairy bud, are a pale, dull gold.

R. Fiebrigii. Grown from seed in January, 1937, the rich orange-scarlet flowers first appeared in April, 1939. The plants resemble *minuscula* in shape, but are covered with much longer white and yellowish bristles.

R. senilis. A young plant bought in June, 1939, flowered the following month. The plant is thickly covered with white bristles, showing off the bright, scarlet flowers very attractively.

R. pygmaea. A very small species, also bought in 1939, in shape somewhat like *minuscula*. The flowers are smaller than any of the previously described species, but are very attractive in a shade of soft orange with greyish edges to the petals.



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SOCIETY NEWS

The speakers for the remaining lectures this year are :—

November 5th	Mr. W. Denton, B.E.M.	MIMICRY MESEMBRYANTHEMUMS
December 3rd	Miss E. Ferguson Kelly	SUCCULENT PLANTS

There will be no meeting in January.

We regret to learn that Mr. S. H. Griffin, of Churt, Farnham, has been bereaved of his wife. Notwithstanding his natural stress, he maintains his interest in our subject and has been good enough to send in a contribution which will appear in a future Journal.

Have you paid the extra 5/- increasing the 1946 subscription to 15/6 ? As the extra amount is due to the cost of the Journal, we trust these, may we say "delinquents," will remedy the omission forthwith and remit to the Hon. Treasurer, Miss H. Mackenzie, 24 Buxton Gardens, Acton, London, W.3.

Thanks are due to Mr. A. Boarder, the Exchange Secretary, for his painstaking effort in distributing the seeds received from Dr. de Boer through the Dutch Society. He has sent out over 350 packets to fifty members and it has entailed a prodigious amount of work separating the minute seeds. This was a labour of love that is not everybody's choice, and we congratulate Mr. Boarder on carrying out such an onerous task so efficiently. Many members express the wish to thank Dr. de Boer and the Dutch Society for their kindness.

Owing to shortage of supplies, Mr. A. Boarder, the Exchange Secretary, Marsworth, Meadway, Ruislip, Middlesex, states that only six members have written him, but normal times will cause his services to be used much more. It is only necessary to send him the genera, not lists of species, with which you wish to exchange and those genera you offer in exchange.

It is with regret that we learn of the death of Dr. Karl von Poellnitz and all his family during the war. Mr. H. Jacobsen, of the Kiel Botanical Gardens, has lost all his personal collection, with the exception of a few *Aizoons*, and the Gardens also lost their collections. Mr. Schick's comprehensive collection of dwarf *Mesembryanthemums* has been destroyed. Professor Schwantes and Dr. A. Tischer have survived but, unfortunately, Professor Kurt Dinter, the well-known investigator of South West African botany, who published a great deal of material on S.W. African succulents, died in December, 1945.

The Deutsche Kakteen Gesellschaft became a Government organisation and, consequently, has ceased to exist, and, so far as is known, all its executives have been killed. Efforts are now being made to restart the D.K.G., and it can only be hoped that the old traditions will be the key note.

The Council ask for volunteers to give addresses at the monthly meetings during 1947. Please write to the Hon. Secretary, Mr. C. H. Rowland, 9 Cromer Road, Chadwell Heath, Essex.

The Librarian, Mr. P. V. Collings, reports good "business" as several members have utilised the Library. Write to Mr. Collings at St. John, Northumberland Road, New Barnet, Herts.

The Hon. Editor, Mr. E. Shurly, 7 Deacons Hill Road, Elstree, Herts., thanks Dr. Elkan for his excellent photographs, and also Mr. R. McKinley, Mr. K. H. Walden, R.S. a helper at Ferd Schmoll, and Mr. B. S. Muckersie for their photographs which will be used as occasion offers, but these are far short of a comprehensive collection of photographs needed so that they can be drawn upon for illustration in future Journals. Why not photograph your specimen plants and send them on to the Editor ?

QUERIES AND REPLIES

If you have a problem, let the Editor have it answered on this page by experts.

EXS (Ruislip). Is there any difference between *Mammillarias fragilis*, *gracilis* and *prolifera* ?

Mammillaria gracilis is a synonym of *M. fragilis*. There are two kinds of the latter, one with stoutish, though short, spines, fat in relation to length and with a distinct, chalky whiteness that cannot be mistaken, the other with much slenderer (*gracilis* is Latin for slender) spines, but otherwise similar. A great deal of confusion exists between *MM. fragilis*, *gracilis*, *prolifera*, *multiceps*, *pusilla* and their varieties. *M. prolifera* appears white with longer and dissimilar spines to *M. fragilis*, *M. multiceps* is rather similar, but appears yellowish. *M. pusilla* is a synonym of *M. multiceps*. *M. fragilis* is quite distinct from either *MM. prolifera* or *multiceps*.

E.K. (Sheen). How often and when should I water cacti, or should I not water them at all ?

Never let the soil get dry, winter or summer. During summer, water as soon as the soil becomes dry or grey, but be sure the soil underneath the surface is also dry by tapping the pot which will give a hollow sound if dry. During winter, some experts prefer to keep them free of water entirely. I advise that plants should only be watered when needed and only to prevent the soil becoming absolutely dry. Tapping gives the danger signal and, if hollow, I advise a light spraying—just enough to dampen the soil. In dull weather, water anytime. In sunshine, evening is best to avoid sun scorching through droplets.

"Cephalium." One of my *Opuntias* flowered and fruited ; from the fruit has come a new pad. Surely this is extraordinary ?

It is, but not unique. It is called "retrograde metamorphosis," meaning that it has reverted to its original or primitive form. Flower and fruit are simply developments or transformation of foliaceous parts of plants. As metamorphosis takes place, it can be understood that, under certain conditions, the process can become retrograde. The conditions governing the transformation are not properly known, but the fact has been frequently recorded.

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