

THE CACTUS JOURNAL

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BOSSFIELD

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Stapelia Getleffii in the garden of Mr. E. Read, Johannesburg.

A Retroflective Stroll Round the Cactus House By R. S. Farden

I BEGAN collecting cacti and succulents in 1898, thirty-five years ago, and when writing this article my first thoughts were for some of my quite original plants. In that year I acquired my *Echinopsis multiplex* which was then one inch high; to-day it is 13 inches high and 14 inches round; it still regularly gives its large rose trumpet flowers, three or four at a time, about twice a season. Another of the same year is *Echinopsis Mulleri*, it was then an offset; to-day it is 10 inches high and 18 inches round, and has the same coloured flowers. These are real old friends.

A curious trait in *Echinopsis* is that the flowers of all the species open on the same day each year and apparently are not influenced by a sunny or a dull day. In 1932 I had 47 flowers of *Echinopsis* out the same day, on some twelve or thirteen plants.

My *Mammillaria polyhedra*, acquired twenty-five years ago as a seedling, is now 12 inches high and 18 inches round. *Mammillaria rhodantha* and its varieties are slow growers and become columnar with age. Four of mine I have had twenty years, and they are now 13 inches high. One of them is growing a large excrescence on the

top, all white woolly and yet has green flesh in parts ; it looks like a lump of cotton wool on the plant and I cannot find out, from anybody, if it is a disease or if it is becoming cristate.

An *Echinocactus Grusonii* I have had twenty-five years, it being then 2 inches high. It has become columnar and is now 14 inches high and 31 inches round.

For the last twenty years I have had climbing night-flowering *Cerei*, *Cereus triangularis*, *C. nycticalis*, *C. Macdonaldae*, *C. grandiflorus* and *C. rostratus*, and all have grown yards and yards and have had to be lopped to keep them within bounds ; they are up against the glass of the roof ; it is some six or eight years generally before they bloom, (*C. rostratus* has never flowered with me). I trained them up into the roof in imitation of the large *C. triangularis* in the Cactus House at Kew. This year, with our week of 80°, some of them were scorched fairly badly and I now think it is a mistake to grow them so. In their native habitat they climb the trees in the forests of Central America, in the shade or semi-shade. If I began again I would give them shade, though that is difficult to find in a cactus house. They have the most lovely flowers and very large ; most of them open about 7.30 p.m. and are closing by 12 p.m. or 1 a.m. *C. triangularis* opens at 7.30 p.m. and remains open till about 12 noon the next day. As I write this evening I have two flowers of *C. triangularis* out ; the petals are white and the sepals yellow ; the stem is 5 inches round, the flower 12 inches tall and 12 inches across. *Cereus flagelliformis* and *C. speciosus* as well as Phyllocacti should be grown in some shade and only put out in the sun to ripen at the end of August. *C. speciosus* I consider the most beautiful of all cactus flowers, (as well as being a profuse bloomer) its large, compact, crimson flowers, with the petals edged purple, are really dazzling.

As regards Opuntias, I have several of my original lot. They have grown too tall for the house and have been cut down to twelve inches, and grown up to the roof again, some of them three times. They very rarely flower with me ; when they do, the fruit never seems to ripen in our cultivation, but remains green and continues to vegetate. The next summer it will, very likely, flower again from the top of the first fruit and again the next year. I have one that has done this, having three fruits one upon the other, but this year, for a change, the topmost fruit has grown a leaf.

Echinocereus poselgeri I have had 22 years ; it covers a space 25 inches round and flowers most years, having a large purple bloom. One of my specimens of *Mammillaria elongata* I have had for twenty-one years ; it now covers a space 30 inches round, with its hundred heads. I have had a specimen of *Mammillaria centricirrha longispina* for 25 years (from a seedling) and it is now 10 inches high and 16 inches round. I have an unusual *Astrophytum ornatum* of the columnar variety, 18 inches high and 21 inches round.

Some of the failures are trying to grow *Cereus flagelliformis*. I am ambitious enough to wish to grow them like those one sees in cottagers windows in our villages, fresh and green and fat and always progressing. Up to now I have failed ; my last effort was in semi-shade, the next effort shall be more shade. For soil, I give them peat and sand and just a little loam. *Aloe variegata* is another teaser ; it wants shade, yet look at them in the village windows.

A Cactophile's collection spread over many years has waves of predilection. My especial favourites, just now, are Gymnocalyciums and Haworthias and Crassulas and their allied genera ; the "penchant" for these latter was induced by seeing Mr. Theobald's splendidly grown plants at our recent show. The Haworthias are all pretty and interesting as no one knows much about them and very little has been written about them. There are some 120 to 130 known varieties ; yet there is not a single dealer in Europe or America or South Africa (their homeland) who catalogues more than a dozen varieties !! This in itself excites one. The names are very difficult to be sure of under these circumstances and I suspect every grower will differ on the subject. So, without mentioning any names. I certainly have fifty-eight species. Of the allied genus, Apicras, there are only about twelve known varieties or so ; of these I have eight species. The two genera are only to be differentiated by their flowers, which are very similar. The Haworthia flower is white with green lines down the six petals ; these petals are arranged three pointing upwards and three pointing downward. The flowers of the Apicras have the same small petals but in a regular rosette.

Mr. J. H. Knowles, the Horticultural Bookseller, has removed from 23a, Beulah Hill, to 87, Church Road, London, S.E.19.

Report of the 1933 Expedition

By Curt Backeberg

AFTER various trips to and fro across Peru, Bolivia and North Argentina, I brought my fourth collecting expedition to a successful conclusion. It has not only yielded a really comprehensive supply of plant material, but it was also rich in many interesting experiences, as a result of the hostilities between Columbia and Paraguay, which, thanks to the letters of introduction to the authorities I had taken with me, did not cause me so much unpleasantness as other foreigners experienced; for especially at the beginning of the Chaco offensive, the control was, not without reason, very strict; later the Argentine boundary was completely closed and strangers were then taken into custody until they could prove themselves inoffensive. The outbreak of an epidemic of spotted fever was, on the contrary, very unpleasant; this is a highly dangerous illness, especially in our profession, for we must be much in the company of the Indians who suffer most from this disease. Twice I had to leave a collecting site on this account. But there was no lack of pleasant episodes. Thus, one night, from the upper berth of my sleeping car (the train was packed with soldiers returning to the front) a man was hauled out whom they had been pursuing for a long time. They thought that I belonged to him, but—again as the result of my letters of introduction—the detective and I were soon good friends. He spoke four languages and we often saw each other afterwards for we travelled southwards for a week on the same train and met constantly.

Another time I was collecting somewhere in the highlands at some distance from the station. A car with several civilians in it appeared suddenly. I knew at once what was happening and when they asked me what I was doing, I answered laughing: "I am taking photographs." This acted like a bomb. But when I explained what I was photographing, they told me plainly that I was only making excuses. I fetched my papers out again and then and there the stern detectives showed themselves to be very amiable people. They had not much to do, so helped me with my collecting and photographing and I spent a very pleasant afternoon with these gentlemen.

My experiences in Salta were also amusing. One fine morning I met a trusty policeman at the corner of one of the larger main streets.

All my explanations and papers were of no avail; I must go to the police station where everything was explained and the reason given. Various "Mafiosos" (members of the Argentine Mafia, of whom there were many on the books) were being sought and one of them was very like me in looks. I started off again, but promptly at another corner another policeman held me up and later yet a third, and both were very much surprised when I explained to them that, this time, I would not accompany them since I was not a Mafioso and had no desire to be moved on by the efficient police. Anyway they are politer in such cases over there than here. They do not say: "You are arrested," but "I present my compliments to you," which sounds much pleasanter.

And now to return to our report. I began collecting in North Peru and had hardly left Cajamarca, when the revolt organised by the Jimenez against Sancho Cerro started. And exactly four weeks later, after I had completed my film-making in the old Inca town of Chan-chan, the leader of the revolt was shot dead amongst those crumbling walls.

Then came the work in Central Peru, where I found a new *Borzicactus* and another *Mila*, and next came my chief collecting activities in the south. As I got nearer and nearer to my main objective the work became ever more interesting. Together with a thorough study of the *Rebutia*, *Parodia* and *Lobivia* groups, I wanted to keep a special look-out for rare *Cerei*. As regards the former genera I had to wait a bit but there must be new *Cerei* here to find, or better, still to be found, for I had already searched here once before.

One can say with confidence that the Cordillera country, especially the districts adjoining the Cordilleras, produce the most beautiful of all the *Cerei* and I was keen to collect a lot of material here so as to be able to demonstrate later what striking forms occur amongst them, for unfortunately many people still do not know how wonderful a collection of such *Cerei* can be. Their advantage is that they grow well but not too quickly, make beautiful spines and, on account of these characteristics, permit the formation of a collection even without a greenhouse. And the grower in the front rank also must consider what space he has at his disposal.

The beginning was, in this respect, quite

successful. Besides the remarkable spherical *Melocactus Jansenianus*, I had found *Cereus pacalaensis*, *pseudomelanostele v. laredensis*, and *Cereus Faustianus*. I was also able to collect again plants of the rare *Cereus eriotrichus* and *cephalomacroctibus*, and then I spotted a most peculiar novelty—*Cereus (Erdisia?) Sextonianus*. Two years earlier I had wandered over the same site but had not seen it and I nearly missed it again. Several times it happened that groups of *Cerei*, dried up in the glistening dust under the burning sun, fell to pieces when kicked. I took them for dead specimens of species I already knew. Then on one occasion when I was resting, by chance I suddenly saw a pink little head projecting from one of those black, mouldering clumps. To-day these old stumps are already making a whole series of beautiful bristly spines, alternately gold and crimson! One sees how dependent on chance the collector may be.

The same thing happened with *C. Jajoinanus* n.sp., which I found a fortnight later. It was after one of the many fruitless hunts for the Peruvian *Oreocereus* related to *Celsianus*, about which I had heard two years earlier, but which I could not find. Another time I was riding about the high pampas in a bad temper, when I found in a Quebrada a large tangle of a fiercely armed, horrible, dirty grey *Cereus*, which however had beautiful orange flowers; with the best will in the world I could not make out which genus it belonged to. I packed it up, without taking much notice of it, for my *Oreocereus* was occupying all my thoughts; but when I got home it had formed a new growth with pretty straw-coloured spines, which looked beautiful against the grey-green epidermis.

And then I found my *Oreocereus*. It had hidden itself very successfully but I was determined not to go back without it, or at least without proving conclusively that it did not occur there. The plants should be up on the flanks of the giant South Peruvian volcano, many thousands of feet up, and to get there was rather a business. The railway to Juliaca, which incidentally goes round about 800 bends, has at this height only tank stations, and so one day I had to travel on a benzine wagon so as not to remain overlong sitting at one of the little halts, for I had already got a slight cold through sleeping on the floor of the station waiting room (there was no other room except the station master's living room). During the journey on the open car at 4,000 metres, this cold became so bad that later I was laid up with fever. I had

tried to do too much. The body gets heated through mountain climbing and collecting and is exposed again to the extraordinarily cold wind of the mountains, when one sits quietly on a mule. This takes its toll in the end. But before this, I had found it; this *Cereus*, which looks like a giant *Trollii*, forms large tangles and has bright cinnabar red flowers. The separate groups stand far apart, quite alone on the flanks of the volcano, and one is lucky to meet one of these white-haired plant colonies. This species is especially beautiful on account of the brown or even blackish coloured cephalium formed later. I called the plant after my friend, Herr Hendriksen of Copenhagen, who once accompanied Bingham's expedition which led to the discovery of *Machupichus*, *Cereus (Oreocereus) Hendriksenianus*. This makes a fourth *Oreocereus*, the others being *C. Celsianus*, *Trollii* and *fossilatus*.

The hunt was often not without danger for the mountain paths are washed out after rain and riding in the pure scree is extremely unpleasant, as a bad fall of one of my Arrieros (mule driver) plainly shows. But one must not think of such things; what it means to have to work in the Cordilleras quite alone, that is with Indians only, my colleague, Friedrich Ritter, knows. The idea of having to lie up there with a damaged foot or otherwise ill, is not very pleasant, if one had not the good fortune to be travelling with a European companion. But the joys of the work outweigh the incidental discomforts that hunting over such tremendous distances entails, and the occasional discoveries of new plants makes up for everything, when the daylong jolting on a mule threatens to stupefy one.

Now for several weeks I never came below the 3,500 metre limit. I began to search the country systematically for *Lobivias* and was lucky to find almost at once in the South East a new species, with spines in tufts and very large red flowers: *Lobivia Hertrichiana*, n.sp. Then *Lobivia corbula* was found again and two more species not yet identified. Finally I filmed the old overgrown Inca ruins lying on almost inaccessible mountain tops, contracted an illness resembling dysentery, and began to make towards Bolivia.

At first I often heartily cursed the film-making; for when I returned home tired in the evening (if one can call it a "home"), naturally the seeds had first to be cleaned; this generally takes a long time and when one longs to get to sleep one must still charge the film holders. But I got fonder and fonder of

the film work, till finally I found it really attractive. The skeleton of the idea of having to take films became ever more shadowy and I came to realise that the celluloid strips would be for me the best remembrancer, and for cactus lovers a unique and living insight into the home of the cacti. I have, therefore, spared no pains to make the pictures as complete as possible. Thus, I hired a flotilla of Indian fishermen on Lake Titicaca, with whom I set out on the water. What an unforgettable experience that was! The yellow straw sails, the wash of the reed boat, the blue sky, the colour of the mountains, and the indescribable beauty of the towering cloud masses around the jagged towering rocks in the distance —!

To be sure the work began with a slight mishap to my deputy "cameraman." He fell from the Balza, as the reed boat is called, into the lake, for the seating accommodation is especially restricted owing to the sharpness of the stern. Thank goodness, I was holding the camera at the time.

Then I took pictures in Tiahuanaco, the old pre-Incan settlement, went up into the mountains, found yet more *Lobivias* up at the boundary regions of the tropical Yungas, and confirmed that the genera *Rebutia* and *Neowerdermannia* extend almost to Lake Titicaca (reckoned from northern Salta in Argentina) and therefore have a very wide distribution. A propos *Neowerdermannia*. It is also called Achacana, which means an edible cactus, as Pasacana is an edible cactus fruit. Dr. Werdermann thought that *Neowerdermannia* were probably eaten at special ceremonies. Unfortunately there are no more to be found at that site to-day. The cactus is eaten simply as food, as the potato is with us. Bolivia is at war and the Indian no longer earns anything and hardly knows what to live on. Can one wonder then that at one place they could only bring me small and unattractive *Neowerdermannias*, and excused themselves by saying that all the large plants had already been eaten on account of necessity! Nothing remained for me to do but to go myself into the remote Lomas of the plateau to collect really beautiful large plants.

I paid a visit to my colleague Marsoner. He is a bachelor, and at the time he was busy setting out his mid-day meal on the table in the kitchen. There was the customary beefsteak and peeled potatoes. Suddenly I noticed that one potato had a central axis and was cut smooth on one side, and then Marsoner told me that the confounded ants

and woodlice had nibbled his *Neowerdermannias* (they do this with us too, as many people know from experience) and he had decided on the spot to eat them himself, so that the woodlice at least should have no more of them. He put pepper, salt, sugar and everything else possible in the "sliced cactus" but he maintained that in spite of all they tasted bitter. Finally we agreed that there must be some trick in their preparation to overcome the bitter taste and decided to leave the further enjoyment of Achacanas to the Indians. Once, when the store is empty, perhaps—a good, straight forward potato tastes better really. However, Marsoner's Achacanas were quite welcome.

Thence northwards, where one finds the first Achacanas, the *Lobivias* also begin to be plentiful. The generic name *Lobivia*, an anagram of Bolivia, is well given for a good half of the *Lobivias* known to-day come either from Bolivia itself or from the South Peruvian boundary and their characteristics belong more to Bolivia than to Peru. Also the North Argentine districts, in which *Lobivias* are also found, are thoroughly Andean and resemble those of Central and South Bolivia, especially South Peru. And, as a background to these well-armed but not very finely coloured plants, there stretches a magnificent landscape, amongst whose stony slopes the *Lobivias* have adopted a clever mimicry of their surroundings, and from out of their bright, gay-coloured flowers speaks the brilliant clearness of their mountain home. Naturally plant collecting in such a district is not easy. In the rainy period the pampas is quite impassable; after this period many tracks are at first what they were originally—empty river beds, filled with an unholy confusion of large boulders, so that one wonders how a passage can ever be made through it again. The stream beds in the Cordilleras are, for the most part, the most important network of communications during the dry period. And on the slopes which rise above the stream beds one finds as a rule the greatest number of cacti. To reach these places is at times impossible. Bridges are torn down, tracks which run along under a rock wall have glissaded into the depths below, and the stream bed, strewn with boulders, can only be put in order after much delay on account of the lack of money. One must reckon then that only seed-bearers can be collected of many varieties and even then the correct handling of them is no light task; up there one is very dependent on luck. One must put up with unwelcome delays, for sometimes

the convoy cannot turn, or they are not ready at the right time to carry the things down and there are always unforeseen incidents.

Thus twice I attempted to reach the North Chaco district, but each time in vain. No chauffeur could be found ready and to make the journey by mule takes so much time that the proceeds become unprofitable. That indeed is the shady side of our journeying, that each trip, so to say, must pay its way, and we have not the freedom of a purely botanical expedition, a circumstance that, in my opinion, is not sufficiently appreciated; for I believe that all our collectors have already made trips often, which from the start obviously could not make a profit, in order to investigate districts which appear to be important botanically. And therefore one must especially deplore that many people, and amongst them unfortunately influential persons, urge the giving up of importation. They forget that science obtains its best material from the collector and without expense, so that the scientific basis of the whole movement would be hedged in and progress would be hindered if the stimulus fails; for the desire of every collector is to obtain something precious, rare and especially interesting. Apart from the fact that a whole series of species can hardly be raised from seed, the keen interest in these plants would never have become so strong if the beauty of imported plants had not given a new incentive. They approach the question from the wrong side. Many of those who to-day only desire to see in their collections plants grown from seed, and who advise against importations, forget that the inconsiderateness of the individual is an offence against the occasional suspicion of the native plants. The lovely looking plants are simply stuck in a pot and sold. Every connoisseur, however, knows that the majority of available imports can be grown on into beautiful specimens, when properly treated, and the dealer is right, i.e., about the necessity of grafting and other special aids to cultivation, and moreover supplies thoroughly well-grown plants. The rejection of imported plants would mean the death of the whole movement because the backbone would thereby be broken.

How many amateurs have already said to me that they do not want only the wonderfully decorative seedlings, although they are the best basis for all collections and show the real beauty of these plants. But now and then one feels one wants to contemplate one of those imported specimens, which show what a cactus really is. The understanding

amateur will not wish to dispense with these types, often unpretentious, uncivilised, grey and covered with many honourable scars of a hard struggle for life, for to tread the golden middle course will be the mission of every true cactus friend.

One finds frequently that the new shoot of a plant used for propagation is especially beautiful and much more suitable for propagation than a seedling, although naturally it is much dearer, for one gets so little stock from it. Thus, for example, the young shoots of old *Cerei* that have been cut down have wonderful spines, wool and growth, quite unusually striking. What has made cacti so desirable is the "mirror of their environment," as exhibited by their habit.

And the *Lobivias* are especially typical. I kept meeting different beautiful species on my wanderings through the highlands—gold, black, brown, large and small, flat and turnip-rooted,—and it became more and more obvious that it is incorrect to regard them as a sub-family of *Echinopsis*. Any one who has crossed the enormous expanse of the high plateau, from hill to hill, from pampas to pampas, from mountain to mountain and has met again and again across immense distances that tenacious family, the *Lobivias*, with their brilliant flowers, the plants almost all in positions where they are likely to experience frost, and any one who considers this, that to-day we know more species of *Lobivia* than of *Echinopsis*, will, as a result, see in this large and vigorous group a relationship with *Echinopsis* certainly, but will not believe that they can be merely a sub-family of *Echinopsis*, the species of which all grow at low levels and in warm regions. Certainly they are closely related to each other and are descended from allied ancestors, but to describe them as one genus with *Echinopsis* seems to me wrong. The flower is almost always from the lower part of the plant body (and here the *Rebutia* resemble them in having similar characteristics, for they show, in *Rebutia aureiflora*, for example, almost *Lobivia*-like flowers); the coloured short-tubed flowers opening during the day are completely self-sterile, so that everything should justify a separation. Between them and the *Echinopsis* which grow at lower levels, are the so-called "Echinopses with hatchet-shaped tubercles" which generally have white flowers, are found as high as the *Lobivias* and much resemble them in the form of the ribs, but have large flowers.

(To be continued.)

Conophytum Germanum, N.E.Br.

GROWTHS 3-5 lines high, 3-5 lines broad and 2-4 lines thick, obconic, with a broadly gaping notch $\frac{1}{4}$ -1 line deep or shallowly 2-lobed at the top, or sometimes subtruncate with a shallow central depression; orifice $\frac{3}{4}$ -1 $\frac{1}{2}$ line long; surface glabrous, smooth, with slightly raised markings more or less purplish on the sides, and the top grey-green or suffused with purple, irregularly marked with separate or confluent rows of slightly raised, blackish green or purple-brown dots, and the orifice outlined and more or less surrounded with dots of the same colour. Ovary not exerted. Calyx 4-lobed, submembranous; tube 1 line long, whiteish; lobes $\frac{3}{4}$ line long, oblong or ovate, obtuse, dull reddish. Corolla about 4 lines in diameter, opening at nightfall, not scented; tube 2 $\frac{1}{2}$ lines long, white, petals not very numerous, lax, 2-2 $\frac{1}{2}$ lines long less than $\frac{1}{4}$ line broad, filiform-linear, white. Stamens about 20 in 3-4 series, arising from about the middle of the corolla tube; filaments white; anthers light yellow, the upper just exerted. Glands in a prominent, crenulated ring, greenish. Style 1 line long; stigmas 4, scarcely or not reaching to the lowest anthers and $\frac{3}{4}$ -1 line long, whiteish with a faint yellowish tint.

South Africa; Hills of Piquetberg Division, *Maughan Brown*.

This belongs to the same group as *C. obcordellum*, N.E.Br.

Conophytum Rarum, N.E.Br.

Plant rarely making an increase of growths but with age forming short branching stems. The only growth seen is about an inch long, 8 $\frac{1}{2}$ lines broad and 7 lines thick, obconic, flattish at the top, with a slight transverse depression across the centre, and a slight ridge transverse to the orifice, which is 2 lines long and has a slight dimple at each end; surface glabrous, smooth, uniformly light grey-green, and so inconspicuously marked with minute dots of a slightly darker grey-green that they may easily escape notice, and the orifice is enclosed in a diamond-shaped ring of the same darker grey-green. Flowers unknown.

The locality of this plant is unknown, but it is probably a native of little Namaqualand. It was discovered by the late Prof. Pearson, who sent a plant of it to Kew in 1911, of which a piece was given to Dr. Rodier Heath, who

gave a cutting of it to a Mrs. Skilton, from whom it passed as a single growth into the hands of Mr. T. Bates, and it is from his plant that I have made the above description for the Kew plant died soon after it was introduced. So far as known to me it has not flowered.

Conophytum Subtilis, N.E.Br.

Stemless. Growths very small, 2-3 lines long and 1 $\frac{1}{2}$ -2 lines in diameter the first year after importation, obconical, circular in outline seen from above, convex on the top, with an orifice $\frac{3}{4}$ line long and scarcely or but slightly depressed below the surface level, but with a slight dimple-like depression at each end; surface glabrous, smooth, uniformly green with a slight bluish tint, without dots or other markings and the orifice not outlined nor coloured. Flowers and fruit not seen.

Little Namaqualand, near Grootmist, *Maughan Brown* 1043.

This is another tiny species of about the size of *C. Herrei*, Schwant., but perfectly distinct and from a very different locality. Apparently it does not flower every year, for on the two plants seen there were no traces of either of them having flowered.

N. E. BROWN.

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On Temperatures

By A. Boarder

WHILE it is of interest to know what extremes of temperature cacti withstand in their own habitat, it is of more value to growers to know what they can stand in an alien atmosphere, as in a greenhouse in this country.

The fortunate possessor of a large stove house, which can be heated up to almost any reasonable degree of temperature, does not worry very much as to how much it may freeze outside, but the amateur with little or no heating apparatus may find plenty to worry over during a severe spell. It may then be of interest to know what degree of cold cacti can stand without coming to any noticeable harm.

During February 1929 there was a spell of very severe weather. My thermometer registered 5° F. or 27° of frost at 10 a.m. out of doors in a fairly sheltered garden, and during several nights it must have been even lower. A gardener friend of mine had about 30 varieties of cacti, *Cereus*, *Echinocactus*, *Mammillarias*, *Opuntias* and *Phyllocacti*, in an unheated greenhouse. The house for which he was gardener was empty at the time and no coke was supplied for the greenhouse. During the above-mentioned spell nearly all the cacti survived, only two or three died. The glass of a greenhouse does not keep out more than about 4° of frost as a rule, and so it needs little imagination to understand how much cold entered the house. Possibly 20° of frost at times and not less than 10° of frost on several consecutive days. During the most severe time my friend found the cacti looking very dark, and so he placed them all under the staging and covered them with paper, with the result that they nearly all recovered. Of course, it is not suggested that one should subject cacti to such spartan treatment, but the instance is quoted to show what extremes of cold they can stand.

My own collection stood 6° of frost in March 1931 without coming to the slightest harm, but *Zinnia* seedlings in the same house were killed. It must be realised that to withstand a few degrees of frost the cacti, including the whole root system, must be very dry. That is the secret of keeping cacti through an ordinary winter without artificial heat. If the plants are thoroughly dried off by the beginning of November they should be safe, as it is very unusual for a severe spell of cold weather to set in before that time. It is

surprising how much cold can be kept out by an ordinary Duplex paraffin oil lamp, and at a cost of 1/2 per week, it can be kept full on day and night. Failing this, sheets of paper inside the glass near the plants will keep out a few degrees.

Now with regard to the heat that cacti can stand. One must realise that the direct rays of the sun through glass are more intense than in the open, and so one must be careful to ensure plenty of ventilation on days when the sun is powerful. On more than one occasion when I have been away the temperature in my house has been over 130° F. in the shade. On these occasions there had been hardly any air on and I have found one or two instances of scorching to *Opuntias*, *Cerei*, *Phyllocacti* and an occasional *Echinopsis*. I have not found a single *Mammillaria* among over 150 kinds scorch in any way, and *Echinocacti* also seem fairly immune. Had the windows been open there is no doubt that no harm whatever would have come to the plants. It is advisable then, if one is going away for a few days to open the windows well in case a very sudden heat wave occurs, as happened in August 1930 and 1932, after a cold wet spell. During these heat waves I find it is an advantage to spray well night and morning, as the plants appear to derive considerable benefit from this.

I do not find that shading the house is necessary but this will no doubt vary according to the locality; it may be necessary near the South Coast. The unfortunate part about shading is that many flowers open only when the sun shines on them and in a house where many kinds are kept one needs all the sun possible for most of them, especially in this rather sunless climate. If any shading is resorted to, it should not be of the semi-permanent type, sprayed on the glass, as perhaps eight days out of ten the sun hardly shines at all. Any shading necessary then should be supplied by blinds which can be put up or down as occasion demands. Fortunately for the possessor of a small greenhouse where the temperature may fluctuate 40° in a few minutes, cacti appear to come to no harm by these sudden variations. There must be few other kinds of plants which could stand such extremes and I feel sure that if the hardiness of cacti was more generally realised, the ranks of cactus enthusiasts would be swelled considerably.

A Little Known Winter-Flowering Plant



IN the months of January and February, when little or nothing is in flower in our cactus collections, every bloom that appears is greeted with special joy. Almost the first comers of the year are the bright red inflorescences of *Bryophyllum tubiflorum* (often called *tubifolium*), which lasts for several weeks. The buds are already showing in December and it is a long time before the flowers open in these sunless months. But even when not in flower, this *Bryophyllum* is a favourite and a beautiful plant. Amongst the compact, round forms of the Cacti, so dainty a succulent plant is very attractive. The stems are blueish grey and the leaves curiously marked with light and dark patches. At the tips of the leaves are a bunch of plantlets, which later produce roots, and then, if the plant is lightly shaken, fall off and form new plants.

The plant is not difficult to grow, and should not be kept too cool in winter.

This description and the accompanying photograph are reproduced through the courtesy of A. F. Haage, Jun., Erfurt.

Book Reviews

"BRASILIEN UND SEINE SÄULENKAKTEEN," by Dr. E. Werdermann, published by Neumann, Neudamm, 1933. Price 6.50 RM (paper-covered), 8.50 RM (linen-covered).

This work on Brazil and its columnar cacti begins with a most interesting account of the expedition made by Dr. Werdermann, under the auspices of the Deutsche Kakteen-Gesellschaft, through Brazil, the chief object of which was to study the occurrence and distribution of the *Cerei* found there. Dr. Werdermann landed at Recife, from which town he made a trip into the desert regions inland. Afterwards he journeyed down through the coastal belt to Bahia, on through Minas Gerães to Rio de Janeiro. The chief means of transport was a Ford car, and the adventures of Dr. Werdermann and his companion are told in a very interesting manner; the frequent references to the cacti found and the many excellent photographs that accompany the text give the reader a clear idea of the conditions under which the *Cerei* grow here. The results are summarised in a chapter on the occurrence and distribution of the cactus flora of Brazil; an interesting section deals with methods of collecting and packing plants, and on the preparation of specimens for the herbarium. The concluding chapter gives a key to the species found, followed by full descriptions of each.

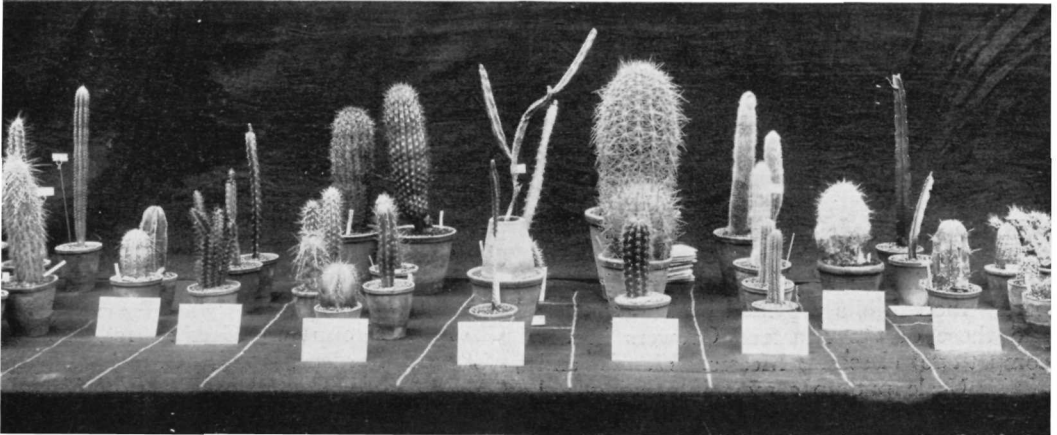
This book will be of interest to all cactus growers and is essential to any one who specialises in the *Cerei*.

If any members who participated in the distribution of seeds from South Africa still have seeds they would like sent in return, the Hon. Secretary would be glad if these could be sent to her by September 18th or, if some are not yet ripe, notice of when they may be expected.

Member's Note

Mr. F. H. Hughes, Westfield Nursery, Packhorse Lane, Hollywood, Nr. Birmingham, is a keen amateur collector of cacti; he is uncertain of the names of some of his plants and would welcome assistance from any member who may be in the district and who would care to see his collection.

JUNE 20th, 1933



6 7 8 9 10 11 12 13 14



27 28 29 30 31 32 33



43

Photos by Reginald A. Malby & Co.

arranged on Britton & Rose's Classification

- | | |
|-------------------------|---------------------|
| 23. OROYA. | 34. ANCISTROCACTUS. |
| 24. STROMBOCACTUS. | 35. THELOCACTUS. |
| 25. LEUCHTENBERGIA. | 36. NEOLLOYDIA. |
| 26. ECHINOFOSULOCACTUS. | 37. CORYPHANTHA. |
| 27. FEROCACTUS. | 38. ESCOBARIA. |
| 28. ECHINOMASTUS. | 39. SOLISIA. |
| 29. GYMNOCALYCIUM. | 40. PELECYPHORA. |
| 30. ECHINOCACTUS. | 41. BARTSCHELLA. |
| 31. HOMALOCEPHALA. | 42. DOLICHOTHELE. |
| 32. ASTROPHYTUM. | 43. MAMMILLARIA. |
| 33. MALACOCARPUS. | |

Cactus and Succulent Exhibition

THE Society held its first Exhibition on June 20th, at the Royal Horticultural Society's Old Hall; and it was the first show devoted entirely to these plants for at least twenty-five years. The number of visitors and the numerous notices accorded to it in the Press were proof of the interest being taken in these plants at the present time.

The Exhibition may be considered in two parts—the exhibits provided by Nurserymen and those of the Amateur Growers in the competitive classes. Messrs. W. T. and H. E. Neale put up a most interesting and instructive group nearly 100 ft. long. This consisted of a number of imported plants recently received from the Backeberg expedition; some very fine examples were included. The many established plants were arranged according to Britton and Rose's classification and thus afforded visitors a comprehensive survey of the family. This part of Mr. Neale's exhibit is shown in the accompanying illustrations.

The London Garden Stores showed an interesting collection of imported plants which had been established in this country many of them in bud or flower. Messrs. C. Engelmann, of Saffron Walden, had some good cacti and other succulents, mostly from California. T. Nitzan staged specimens of cacti and succulents from his nurseries in Palestine.

The entries in the Competitive Classes for Amateurs were good, both in number and quality.

The Lawrence Cup, presented by the President, Sir William Lawrence, Bart., for an exhibit of Sedums, Sempervivums and Cotyledons was awarded to Mr. W. G. Theobald of Steyning. The plants staged were in beautiful condition, showing a wide range of colouring and with the bloom on the leaves quite undamaged, as evidence that they had been most carefully grown and handled. Mr. Theobald also won the Cup presented by Capt. E. J. W. Noakes for a group of succulents. Further examples of his beautiful plants were staged on 12 ft. of tabling as a non-competitive exhibit and do great credit to Mr. Theobald and to his gardener, Mr. R. Baker. The Evelyn Theobald Cup, presented by Mr. Theobald for a group of cacti, was awarded to Mr. R. S. Farden of Sutton for a fine group of plants, some of which had been in his collection for twenty years and more. The Miniature

Garden Cup, presented by Mr. S. J. Pullen, was won by Mr. W. V. Bishop for a very suitably planted and decorative miniature cactus garden. The King Medal, presented by Mr. T. King for nine Mammillarias, was awarded to Mr. A. E. Watts of Fenny Bentley Hall; his plants, all of which had been in his possession for a number of years, were exceptionally well grown.

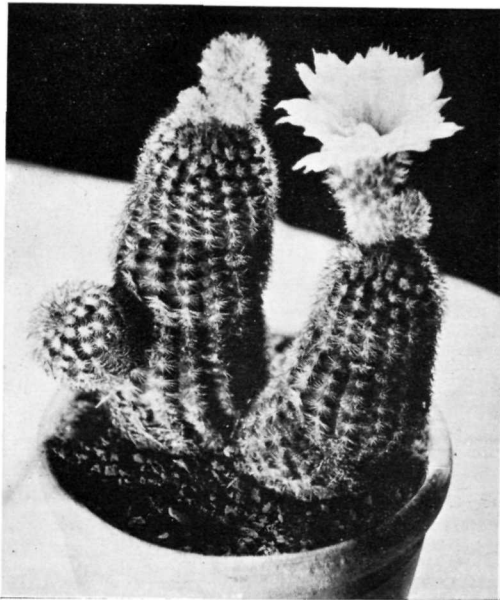
The full list of awards is given below:—

- Class 1. Group of Cacti: 1st, R. S. Farden; 2nd, C. T. Lloyd; 3rd, Capt. Noakes; Commended, P. V. Collings.
- Class 2. 9 Mammillarias: 1st, A. E. Watts; 2nd, Capt. Noakes; 3rd, P. V. Collings.
- Class 3. 9 Echinocacti: 1st, Capt. Noakes; 2nd, P. V. Collings; 3rd, R. S. Farden.
- Class 4. 9 Echinocerei: 1st, Capt. Noakes; 2nd, R. S. Farden; 3rd, C. T. Lloyd.
- Class 5. 9 Cerei: 1st, Capt. Noakes; 2nd, R. S. Farden; 3rd, S. J. Pullen.
- Class 6. 9 Opuntias: 1st, Mrs. A. Davey; 3rd, S. J. Pullen.
- Class 7. 6 Cacti: 1st, Capt. Noakes; 2nd, A. Emm; 3rd, Mrs. Davey; Commended, C. T. Lloyd.
- Class 8. 4 Cristates: 1st, Capt. Noakes; 3rd, S. J. Pullen.
- Class 9. 9 Cacti in Flower: 1st, Capt. Noakes; 2nd, Mrs. Higgins.
- Class 10. Miniature Garden: 1st, W. V. Bishop; 2nd, Mrs. Sheffield; 3rd, Capt. Noakes.
- Class 11. Group of Sedums, etc.: 1st, W. G. Theobald.
- Class 12. Group of Succulents: 1st, W. G. Theobald; 2nd, R. S. Farden.
- Class 13. 6 Euphorbias: 1st, W. Denton; 2nd, W. F. Higgins; 3rd, Dr. H. T. Marrable.
- Class 14. 9 Mesembryanthemums: 1st, W. Denton; 2nd, T. King; 3rd, Mrs. A. Davey.
- Class 15. 9 Succulents: 1st, T. King; 2nd, Mrs. Higgins; 3rd, R. S. Farden.
- Class 16. Seedlings: 1st, Dr. Marrable; 2nd, J. Haddon; 3rd, Mrs. Higgins.

Editorial

Photographs of cacti and other succulents in their natural habitat and in cultivation were shown. Some of these had been sent by members living abroad; Mr. Murray Horne kindly loaned pictures that had been taken in the peninsula of Lower California, when he accompanied Mr. H. E. Gates on one of his expeditions. Some very beautiful photographs and transparencies in colour of cacti in flower were shown by Mr. W. Abbing.

The Council were very glad to welcome among the visitors to the Exhibition many members of the Society who live some distance from London and cannot regularly attend the monthly meetings. Both visitors and exhibitors considered the Show to be a success and it is proposed to hold a second Exhibition next year, the date fixed being July 24th, 1934. It is hoped that members who visited the exhibition this year will be inspired to exhibit plants themselves next time, so that there may be an even better show than this year.



The above photograph shows a plant of *Echinocereus Fitchii*, flowering on February 3rd, 1933, in the collection of Mrs. B. E. Craig. The plant had been in a small frame outside the window, on a flat roof, where it had had no sun since October, the only heat in the frame being supplied by an electric light bulb during frosty weather.

WITH the present number, the CACTUS JOURNAL begins its second year, and it has again been possible to increase the size. We should like to thank all those who have contributed so far and hope that they and other members and friends will continue to send us articles and photographs likely to be of interest to their fellow members.

We have heard of a number of people who have been pursuing this pleasant hobby for years without finding friends with a similar interest, and one of the functions of the Society is to bring such people into touch with each other. One may get great pleasure from the cultivation of some special group of plants, but even the enthusiast will find it a little damping to his ardour when his hobby is regarded as "queer." The description—"He grows cacti!"—is apt to imply that, though really quite a nice person, yet he is slightly eccentric. True, the initiated can take this with a smile, knowing that they have an interesting pastime for their leisure hours. The fact that cactus growers in this country have now banded together will do much—in fact, has already done much—to dispel this antiquated idea that cactus growing is a hobby for queer people only; the encouragement that comes with the knowledge that many other people share one's interests is very real and the signs all seem to point to a revival of interest in these plants on a considerable scale. The increased interest means a demand for plants; the supply has had to come largely from abroad hitherto and therefore we welcome the nurserymen in this country who are taking up these plants, we hope to our mutual benefit. And since it is natural that each amateur will be fired by the spirit of friendly rivalry, the importation of new plants and seeds can only be an additional advantage. For the cactus grower, unlike the grower of horticultural varieties, is concerned also with the scientific side; he does not need to make new varieties. Nature having provided a very bountiful supply of these already, but he will find it of interest to be able to collect as many examples as possible of any group, and to compare and contrast them, both as regards their natural form and their behaviour under cultivation. And when he has made interesting observations he will no longer feel there is no one with whom he can share his discoveries; the JOURNAL is the medium by which he can hand on the information to others.

On Hairs and Spines

By C. D. O'Donoghue

(Résumé of a Talk given on May 9th, 1933.)

MR. O'DONOGHUE began by considering hairs; these are always produced from the skin and not from a deeper layer. The skin is not a dead thing but a live factory; the outer layer of cells has openings through which the plant breathes and the next layer contains the green colouring matter, which is vital to the plant since all chemical action depends on it.

Mr. O'Donoghue does not consider that hairs are developed as a protection from the sun; many hairy plants grow on the tops of mountains where there is much mist and dew; probably the chief purpose of hairs is to keep out moisture. In *Rochea falcata* there is a modification of hairs into vesicles which contain water that can be used by the plant as required. Hairs occur in cacti but usually at the top to protect the growing point, around the base of the spines and, in *Mammillarias*, in the axils of the tubercles. These probably prevent undue evaporation. The real protection from the sun is provided by the much thickened cuticle.

Thorns, prickles and spines, Mr. O'Donoghue considers to be a bit of nature's untidiness. They do give protection but they were not put there for that purpose. Gorse is protected by its thorns, but why has the Broom, which grows beside it, no thorns also? In a greenhouse, gorse can be grown so that it produces leaves instead of thorns. In these cases the stem is green and does the work of the leaves, so Nature has not developed the leaf substance, but collected the strands together to form thorns. Numerous illustrations were given:—the spines of *Cotyledon reticulata* are old flowering stems, as is the case in *Euphorbia meloformis*. In other cases, the thorns are old leaf bases, as in *Cotyledon Wallicherii*; in *Sarcocaulon* the thorns are leaf stalks. In *Fouquieria splendens* the thorn consists of the mid-rib of the leaf as well as the stalk, the blade drying up and falling off.

The origin of spines is still in dispute; some people say they arise from the skin only, others hold that they are of deeper origin and connected with the vascular bundles that supply food to the leaves, etc. In the case of cacti, the origin of the spine is not well understood; microscopic work carried out by German botanists seems to prove that the

spines are not connected with the vascular bundles, but Mr. O'Donoghue thinks that the facts have been misinterpreted and that the spines in this case also are degenerate leaf-bases; and compared them with the spines produced by the suppressed branches in the *Berberis*.

Spines are not necessarily for protection; some cacti, in fact, have no spines. The paper-like spines of *Opuntia papyracantha* become rigid when moistened, showing they have absorbed water and other types of spines do the same. The spines of *Pilocereus Fricii* absorb so much water that algae live in them. Spines of *Cereus* and *Opuntia* are absorbent in the lower portion and all spines with frayed surfaces and all plume-like spines are especially capable of absorbing moisture.

To get good spines developed under cultivation the plant must be in good health and well-drained. As an example Mr. O'Donoghue mentioned a neglected cactus that he had which should have had spines 1-2 inches long, but had none at all; last year it was watered at the base and then began to make spines, even on old areoles; this appears to be an exceptional case. The proper ripening of the present season's healthy growth is the first step towards good spine production in the following season.

The talk was illustrated by drawings and plants.

Slugs

The following letter has been received from Mr. E. Read, of Johannesburg:—

"I have just received my copy of the June number of your most interesting Journal and notice the complaints of two of your contributors about the devastation caused by slugs when specimens are put into the open. With all our South African pests, this is one that troubles us little in the open air, although it causes some destruction in greenhouses, and in this connection a friend of mine has been most successful with 'meta,' or solid methylated spirits, which can be obtained at any chemists. The meta is crushed and placed in small heaps round the plants. It appears to attract all the slugs in the neighbourhood and kill them. I pass on the information in the hope that it may be of use to members."

Mammillaria Ocamponis?

Extract from a Letter from Mr. Oscar Smrz, Dec. 6th, 1932.



Mammillaria Ocamponis is an oval shaped plant, rather thin-skinned and very fleshy. The tubercles are rather large and pronounced with a cluster of about 20 fine white spines on each, with 2 strong dark red spines, one hooked. The flowers are pale cerise pink with a dark stripe of the same colour down the centre of each petal. They have a distinct tube about $1\frac{1}{2}$ in. long, which is unusual for a *Mammillaria* and the flowers open by day, about $1\frac{3}{8}$ in. across. The flowers resemble those of some of the *Rebutias*.

The plant depicted was raised from seed sown in January 1932 and it flowered on March 31st, 1933. Five flowers opened, four at one time, and they lasted about six days. The photograph shows one bud, two flowers and two flowers finished, and was taken on April 5th, 1933, by Mr. W. Abbing; the plant was then $1\frac{1}{2}$ in. across over the spines.

A. BOARDER.

[*Mammillaria Ocamponis* is a synonym of *M. mercadensis* whose flowers are described as "small." The plant offered in catalogues under this name appears not to be the true *M. Ocamponis* but is probably *M. longiflora*; the photograph certainly indicates that this is the true name of this specimen.—ED.]

"You will certainly be interested to hear of our Society. It may astonish you that such a small country as Czecho-Slovakia has also a Cactus Society and that it was started before others in larger countries. But the love of cacti and other plants was well developed in Czecho-Slovakia a very long time ago.

"We have had for 50 years many great collectors of cacti, for example, the famous Zdenko Seitz of Prague; he named one variety of *Cereus Chiloensis* after our national hero Žiska, the famous warrior of the Russian War,—*Cereus Chiloensis* var. *Ziskaanus*. The plant *Cereus Roesli* is after our great orchid and cactus collector, Benedict Roesli, who was the finder of *Cereus Dautwitzii* and other old cacti. The famous garden of Prince Salm-Dyck was situated in Prague and there was there assembled a very large collection of cacti and succulents.

"After the World War, the love of cacti increased rapidly in our country and our Society was formed in 1922. The name 'Spolek pestitelů kaktusu v RCS' is in English, 'Society of Cactus Growers in the Czecho-Slovakian Republic.' It is open to commercial collectors, but most of the members are amateurs. We have 646 members. Our Journal is named 'Kaktusarske Listy,' which is in English 'Journal of Cactus Lovers.' It was first published in 1925 and it has from its commencement appeared monthly and is sent free to members."

The Royal Horticultural Society has kindly given permission for Members of the Cactus Society, who are not Fellows of the R.H.S., to visit their Flower Show, when still open, after meetings of the Cactus Society. This privilege is also extended to members for half-an-hour before a Cactus Society Meeting. The Hon. Secretary particularly wishes to point out that Membership Tickets of the Cactus Society do *not* admit to the Hall earlier than half-an-hour before a meeting, or on any other occasion.

Cacti from an Artistic Point of View

By H. J. de Vries

(Read at the Meeting on July 18th, 1933.)

WHEN, some time ago, our Secretary asked me to give a lecture, I accepted the invitation with reserve. I thought it would be presumptuous that I, most probably one of the youngest in experience, should respond to this request unhesitatingly. I had to think it over. Well, it had struck me very often, visiting a cactus collection, I heard nothing but technical remarks, highly interesting remarks that I took to heart, but all the same, purely technical. I heard about the rarity of one kind, about the difficulty of growing another, about the typical differences between a third and a fourth, about soil mixtures and burnt clay, their advantages disadvantages, about the size and colour of this or that flower, about the number of flowers on one plant and so on, but I never heard a word about the cactus as a thing of beauty.

In the 1930 catalogue of Haage is a photograph of a man absorbed in the admiration of a flowering cactus, and the face of that man speaks volumes. It was this photograph that gave me the idea of talking about the beauty of cacti, about their artistic value, about a cactus as a thing in itself, regardless of any technicality.

What is really the great attraction of a cactus, or of cacti, for thousands of people? I don't of course count among those thousands the people who buy in a flower shop "that little spiny thing" because it is so funny or so extraordinary, and who kill it in a short time either by lack of care or by too much. No, I mean cactus lovers, that is you and me.

When, some three years ago, I started to collect cacti *and* succulents, a very common start for every beginner to collect both, I was moderately interested. I had never seen a really good collection. And, when I ask your answer to this question:—What is the great attraction? I should get as many different answers as there are people here. I will give you mine.

To start with it was love at first sight. I got a few cuttings from a friend of mine (I was staying in Holland at that time for my health), and I was told that they would strike easily and that collecting cacti was a nice hobby. I still remember what I got very well; some were labelled, some not, but that did not matter very much. They looked nice and fresh, were of about the same size, so of

course I had them planted in 2 in. pots—a nice row of twelve. I felt very proud, they looked lovely. I called them all cacti (I know now that I had only two cacti, cuttings of *Cereus Spachianus* and ten succulents) and treated them all in the same way. What I knew of cacti was that they came from hot and dry places in Mexico, a country where there is hardly any rain. I was rather disappointed after some weeks that some of the plants were not thriving. It was a hot summer and I tried my level best to give them as much as possible a Mexican climate; in the daytime I put them in the blazing sun and at nightfall I gave them an imitation dew in the form of a fine spray. After three weeks half my plants had perished. I felt there was some mistake in my treatment and as I did not want to be beaten, I ordered at the booksellers a book about *Cacti and how to treat them*. I got a little Dutch book, full of names I had never heard of and with pictures of the plants, not in the least looking like my cacti. That did not help me much. I tried to get information from the man who had given me the plants but he was away. I was stranded.

But a Dutch proverb says:—"When need is at its highest, help is near." A few days later, I heard accidentally that only a few miles away from the place where I was staying two gentlemen lived who each had a large collection. I got an introduction to one of them and saw cacti for the first time in my life! It was an eye-opener when I entered the cactus house on that beautiful morning. I felt, when I looked round, that I stood on the threshold of something undreamt of. I was very lucky for my guide was an ardent lover of cacti and succulents. He had been a collector for years, and knew, as I found out later, everything about his plants—their history, their habit and their beauty.

"Beauty in a cactus," that was something new to me. The owner showed me his collection in a more or less casual way, making here and there an interesting remark, and in half an hour we were at the end. But my interest in what I had seen and heard was greatly aroused and to my host's surprise I asked him whether I could come again later on, to see everything at my leisure. He told me later that he thought me to be one of the many casual visitors, who went to see every

collection, whether it is furniture, china, candlesticks or cacti, just to be able to say: "I have seen so-and-so's collection—marvellous, marvellous!" though they had not really *seen* anything. It was during the second visit, a few days later, that I began to see the beauty of the plants. What struck me first was the nearly geometrical regularity, causing a great restfulness to the eye, and a great simplicity of form. I was very vividly reminded of things I had seen before, of old Japanese earthenware, of old bronze, of photographs in a book by the famous biologist Prof. Haeckel, *Über die Schönheiten der Microcosmos*, enlargements of micro-photographs of Infusoria, of microscopic little shells, showing an endless variety in form, constructed by nature on a purely geometrical principle, just as systematic as a Gothic cathedral.

I had the privilege of studying art for several years of my life, and one learns then gradually to see the big outline, the grouping of the masses, without getting drowned in details, to see the constructive principle laid down, consciously or subconsciously, by the artist in every work of art, be it a Greek temple or a piece of Indian metal work, a Persian rug or a piece of native wood-carving. I came to the anomaly of seeing in those cacti precious works of art, *made by nature*. The remarkable thing is that, even now, whenever I see the well-known photograph of the *Cereus giganteus* from Florence in Arizona—that enormous and cross-like *Cereus*—although I know it is a plant, I always have at the back of my mind the idea that some one is pulling my leg. The similarity with the luxurious ornaments of the Anghor Vat, of the Jupiter Capitolinus and those of the late Gothic Churches, even with the ornamentation of some Samoan art is striking. And it is not only cacti, some succulents play the same trick with me. Amongst the Mesembryanthema, Euphorbias, Echeverias, Haworthias, Gasterias, Sempervivums and Cotyledons, are several of exquisite beauty in the art sense. Some are just pieces of old Saxon China—*Cotyledon undulata*, *Echeveria Weinbergii*; some remind one of old bronze with a rich greenish patina—*Astrophytum myriostigma* and *asterias*, *Euphorbia meloformis*, *obesa* and *canariensis*, *Aeonium Haworthii*, etc.

And not only old plants, even young ones are for several reasons highly fascinating. I got the other day from a friend, Mr. Boarder, a seedling of *Mammillaria micromeris Greggii*, a tiny mite $\frac{3}{4}$ in. high, the body

dark purple and covered with minute silvery stars, a lovely thing to look at. Next to this little beauty stands a *Mammillaria Scolymoides*, *M. candida* var. *Humboldtii*, a *Cephalocereus arrabideae*, all beauties in waistcoat pocket size, and a seedling of *Kalanchoe verticillatum*, kindly given me by Mr. Lambert, who raised it from seed in his greenhouse full of marvels. It is just like a miniature candelabrum, elegant in form and lovely in colour. I mention only a few but they are a feast for the eyes. Their regularity, their variety of form, colour and decoration can hardly be described.

When the plants are older, they get so typically that character of maturity, of "having settled down" that there is, I am inclined to say, something human about the plant. I remember an old specimen of *Echinocactus myriostigma*, Salm var. *quadricostatus* in the collection of Mr. Edean, a very old one. The colour is a glorious silver bronze, and the four sides go down in heavy folds, brownish in colour, with here and there silvery patches, acting more or less as high lights. The whole thing looks monumental, serious, serene.

A special feature of cacti are the spines, the antipathy of those who do not like cacti, the delight of those who do. What variety, what beauty! I do not mean the spine by itself—although the study of spine forms is more than worth while—but the grouping, the colouring! There are, of course, a few kinds which are not beautiful at all, however interesting they may be; those for instance of the *senilis* type, those of *Opuntia papyracantha*, etc. But there are scores of plants, hundreds in fact, with spines which are (by their grouping and colouring) real embellishments. I have in my possession a little *Mammillaria*, about 1 in. in diameter, a not yet classified Mexican import; it approaches *M. Viereckii*. The little ball is covered with deep golden spines—a real thing of beauty, just like a piece of Padang filigree work. All the different varieties of *M. elongata* have lovely spines. Over the whole plant is a metallic sheen, either bronze, or silver or golden. To admire the beauty of the spine systems in full, look down on the top.

Apart from beauty, the spines give to the whole plant such pronounced character. A cactus is not, generally speaking, what we call a lovely plant, as for instance is a rose, a geranium or a campanula. It is too serious, there is hardly a smile, never a laugh. That is mainly due to the spines, not because they are sharp and can wound, for we know how

to handle them, but because there is something in a spine-clad cactus that seems to say: "Leave me alone, I can manage very well, thank you."

As I have a profound admiration for the form and colouring of most cacti, I feel I should do an injustice to some of those I do not like so much, if I judged them, because we do not see them in their natural habitat. I refer, for instance, to the climbing *Cerei*. We know them wound round four or five sticks or fastened to a kind of trellis work, in a pot, which is of course a caricature of the real thing. The only part of the plant we can admire is the flower; that is much, but not enough. I except, of course, *Cereus flagelliformis*, of which plant I saw a magnificent specimen in the window box of a farm house in Brienz, the plant in full bloom, hanging down in large festoons.

What I dislike very much from an artistic point of view, however interesting they may be, are the monstrosities and the cristates. I have only once seen a *Cereus peruvianus* var. *monstrosa*, which approached the idea of beauty, but I did not for the moment associate it with the idea of plant. It reminded me of and old Japanese woodcut, a drawing of a rock, brushed over with colour.

Another form that goes against the grain from the point of view of beauty, is the grafted cactus. It may be that grafting has many advantages, that we can attain by grafting better results with weak specimens, but the plant as a whole is ugly. Perhaps the only exception is an Epiphyllum grafted on a *Pereskia* stem, but even then the junction very rarely seems natural. I know some will argue the point and say that there would be no fruit trees, no roses and so forth, without grafting. True, but a grafted pear tree or a standard rose is not ugly, a grafted cactus is.

I often wonder, when people get enraptured about their cactus flowers, whether the ecstasy is caused by the fact that the cactus is flowering, or by the beauty of the flower itself. I am inclined to think that the first case occurs more often than the second. I have seen people in ecstasy about the flowering of an ordinary *M. Wildii*. Certainly the little flower is pretty, but do not forget that a daisy, a foxglove, a *Monbretia*—to mention a few haphazard—are at least just as pretty. I enjoy my *Wildii*, with that yellow sheen, caused by the little yellow curved spines just as much with as without flowers. There are several *Mammillarias* whose small carmine or cerise flowers do not adorn the flower as much as the berries which take their

place later on. Some cacti and succulents have beautiful flowers, there is no doubt about that, flowers of outstanding beauty. It is not even necessary to go as far as the flower of *Cereus grandiflorus*, or the flowers of some *Phyllocacti*, which are unsurpassed, even by orchids.

There are several green flowers in nature. Most of our trees have them. Amongst the wild flowers is the well-known climber, *Bryonia dioica*, with green flowers. Some nurserymen, always trying to get something new, have for years tried to get green roses. About thirty years ago I saw the first results, lately I have seen another; people, not knowing what it is would call it, most likely, a Brussels sprout. Put next to that green rose the green flower of *Echinocereus viridiflorus*, a dream of loveliness, with its green satiny petals, going down in the centre from green to creamy white. The bright green stigma in the middle gives the effect of making the calyx appear deeper.

What strikes me always as extremely beautiful is the texture of the petals. It is quite different from any other kind of flower. The nearest approach as far as I know, are the petals of the "Star of the Veldt," the well-known South African flower. There is a sheen over them just as over satin, but even the finest satin is coarse in comparison with the petals of the cacti and several other succulent flowers. Just a few days ago my *Caralluma Munbyana* flowered; the little flowers appear at the very end of the fleshy branches; each has a diameter of $\frac{3}{4}$ in. and is of the star type like those of *Stapelias*, but without the awful smell. That little aristocratic wonder, pentagonal in shape, is brownish purple with, towards the centre, greenish creamy, waved, transverse lines surrounding the minute complex of stamen and stigma. The dark purple centre has five stamens with bright golden yellow tops standing out in those dark surroundings and over the whole flower is that same lovely satiny sheen.

What we really miss in flowering cacti and in some flowering succulents is "elegance." When we compare them with any other flowering plant we see at once the difference; the flower stem or stalk is usually clumsy and out of proportion to the plant. When the stem is short it is often hidden by the flower, as is the case with most of the *Echinocacti*, but look at a flowering *Echinocereus*. It is simply ugly in spite of the beautiful flower. The flowers are lovely, but look at the connection between flower and plant. It seems so

haphazard. It seems very often as if the flower does not belong to the plant at all.

A real adornment of cacti, especially of the Mammillarias, are the rows of ripe berries, wound like a string of beads round the plant, in all shades of red and yellow. As I said before, the berries often beautify the plant more than the flowers.

When we survey the vast realms of decorative art, we see that in every period and in every country—in Europe only up to the sixteenth century—people have used plants found in the country itself, as elements for decorative purposes. Perhaps the only exception in the Old World is the Arabic art of Egypt and Spain, where geometrical ornament is used exclusively. Old Egypt with its lotus, papyrus and palm, India with its lotus and innumerable other plants and flowers, Persia with its tulip, carnations and watermelon, Japan and China with practically everything that nature produces, Greece with the acanthus, palm and iris leaf, the ornamentation in Italy, Spain, Portugal, France, Germany, England, etc., from the twelfth to the sixteenth century with all kinds of leaves and flowers, several even taken from the kitchen garden, are so many examples. Knowing this, one would expect the same in the civilised empires of the New World, Mexico and Peru; we should expect that for ornamentation native plants would be used and amongst them the cactus. It is true in Mexico and in the coastal regions of Peru plants are comparatively scarce, but what about the luxurious vegetation of Central America, where the Maya art once flourished, what about the flora of the country round the imperial town of Cuzco in Peru? In their rich ornamentation the Mexicans and central Americans have mainly used the human face, the snake, a mythological bird, conventional line ornament and of plants—but very exceptionally—the maize and a kind of water plant. South America does not give better results, although we have a rich collection of textiles found in old Peruvian cemeteries to judge from. We find mainly line ornament, very closely resembling Chinese and Japanese ornaments, here and there very primitive human forms, fishes, cats, birds, but of plant forms not a trace. Only in the beautiful Peruvian pottery do we find occasionally plant forms, especially of fruit. Still, in the remarkable collection of Dr. Gaffron, an ophthalmic doctor who lived for years in Peru, and collected a great number of Peruvian antiquities—which collection is now in the Academie der Wissenschaft in

Munich—I found, amongst the innumerable specimens of pottery, two vases in black brown clay, one with two fruits of *Opuntia ficus indica*, the other in the form of an *Echinocactus setispinus*. That is all I could find with certainty, of the use of cactus forms in the decorative art of the countries where the cacti grow. One cannot deny that among the Mexicans and the Peruvians great artists lived. The bust in the British Museum, found in Copan, the Mexican and Mayan sculptures, the Peruvian pottery and textiles, the ruins of their buildings prove it. But their minds were, most likely, void of all interest in plant life. We may deplore it, we may wish that cacti grew in Japan, being sure that the Japanese artist would have enriched art with the beauties I see so often in cacti, but that is all that can be said. We have to do it without our teacher of beauty—the artist—we have to see for ourselves.

The Spines of Cacti

In his paper about succulent plants, published in the first number of the CACTUS JOURNAL, Dr. N. E. Brown says:—"It is usually supposed that spines are developed to defend plants from browsing animals. I have been informed, however, by a traveller who had journeyed through the desert regions of Peru and Chili, where Cacti flourished, that his mules, when thirsty, would quickly scrape off the spines of the cacti with their hooves and suck and eat the pulpy part of the plant."

I would suggest that there were no large-hoofed animals in America till the Spaniards introduced horses. The only large browsing animals were the various species of llama which are not hoofed.

The Cactus developed his spines as a protection against browsers of that type. He is now in the same position as we are, who designed elaborate stone, brick and concrete fortresses, only to find them useless against air-craft and heavy artillery. That the spines serve also, as Dr. Brown suggests, as affording an extra surface on which water condenses at night, is no doubt correct. But surely their primary purpose is defence. If the mules were shod with iron they would have a most unfair advantage. Not even the most intelligent Cactus could have foreseen such a trick being played upon him.

M. E. DURHAM.

Fouquieria Columnaris



On Page 50 of the CACTUS JOURNAL, No. 4, Mr. Cobbold refers to specimens of *Fouquieria columnaris* in the Darrah, Kew and Westbury collections. Mr. Thomas Sharp, the owner of the Westbury collection, has kindly sent the accompanying photograph of his plant. The Kew and Westbury plants were imported fifty years ago by the late Mr. Justus Corderoy, of Blewbury, Berks. The collection at Westbury was made primarily for educational purposes and can be seen by any one interested.

Exchanges

Mr. T. Waring, The Weir, Woolston, Warrington, has about 100 different varieties of cacti and succulents which he would be glad to exchange for other varieties ; members

Page Twenty

who are interested are asked to communicate with him.

Mr. A. H. Maytum, Highland, Alkington Green, Middleton, Nr. Manchester, has the following plants for exchange :—

Cereus Silvestrii.
Echinopsis oxygona.
 „ *Eyriesii*.
 „ *undulata*.
 „ *Huottii*.
Aloe, Partridge-breasted.
Crassula portulica.
Stapelia variegata.
Echinocereus Salmianus.
Opuntia aurantiaca.
Kleinia spicata.

Mr. A. E. Watts, Fenny Bentley Hall, Ashbourne, Derbyshire, has numerous healthy monster specimen cacti for disposal, 30 years old ; these include *Cereus peruvianus*, *C. jamacaru*, *C. macrogonus* ; the plants are 7 to 9 ft. high, 10 to 20 in. in circumference. For particulars, please apply to Mr. Watts.

Queries

1. How does the foreigner make very young plants, as shown in most illustrated catalogues, flower ? We know they are young as well as small by the number of spine clusters.

2. What is the use to the plant of the secretion from a gland behind the areole of some of the *Coryphantha* species ? It seems at the head of the furrow. *Fercactus uncinatus* has it also.

3. What is the cause of the black, minute smut arising round the areole of some plants ? It occurs also, or a similar affection, in patches on the surface. If taken in time it can be carefully taken off with a stiff brush or blunt knife edge.

4. The centres of some plants go brown and become almost black by another affection (*not* caused by water or damp), which eventually kills the plant, or if one is able to stop it with a suitably hard or soft brush, leaves a brown scaly ring always on the plant. What is the cause of this ?

H. J. TURNER.

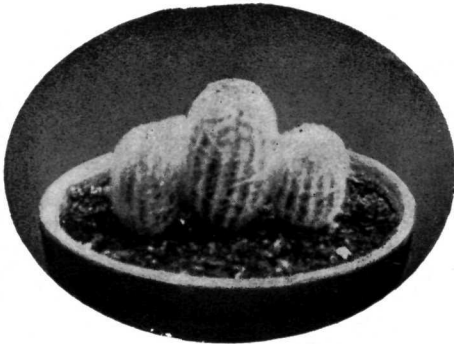
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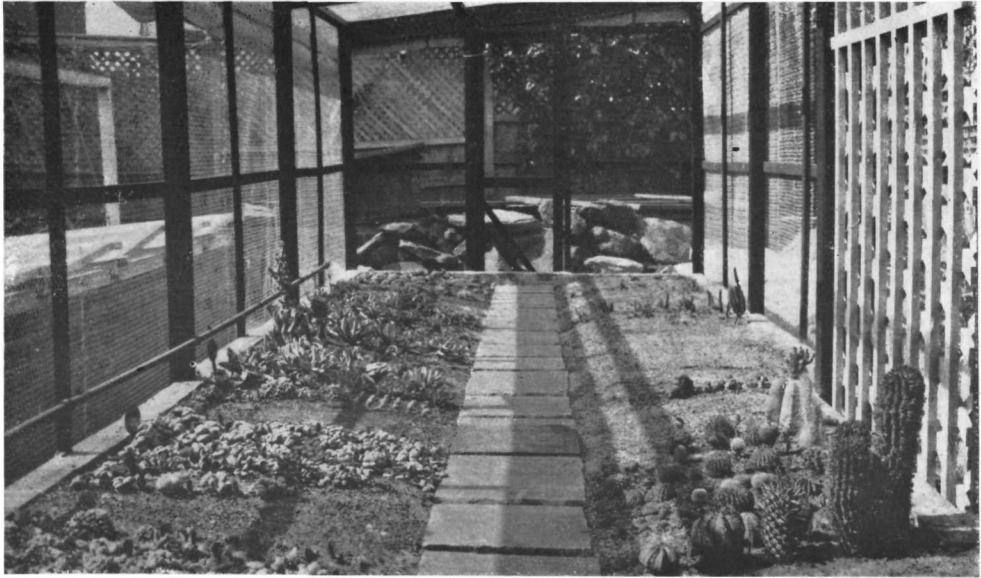
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Succulents as grown by Mr. H. J. Solomon in Sydney.

Succulents in Australia

LETTERS have been received from Mr. H. J. Solomon of Sydney, giving descriptions of his collection and methods of cultivation.

Mr. Solomon says: "It will perhaps interest you to know that I have planted over eight hundred different kinds of cacti, in fact, practically all in Britton and Rose's work and various dealers' catalogues, but unfortunately they do not do very well in the open in the Sydney climate; there is too much moisture during January, February and March, heavy rains and 70 per cent. to 80 per cent. atmospheric moisture and cactus won't stand that. I am now concentrating on South African succulents, particularly Mesembryanthemums, of which

I have about four hundred sorts, besides many duplicates. These I cultivate under large pergolas with a special compost of decomposed granite, clay, sand and leaf soil. The whole lot wire netted to keep the birds off and covered with waterproof blinds to protect from rain. Here I find the right way to cultivate them is to give them all the sunshine they can get, which we fortunately have for about ten months of the year and grow them as hard as possible. I find this prevents disease and keeps them as near the natural conditions as is possible under cultivation.

"I am also getting together a comprehensive collection of the Echeveria and Cotyledon families and have about 150 different sorts,

and these, with sundry Cymbidiums and Cypripediums, I grow under rockery conditions in a cold house."

And again: "I have been an ardent collector for many years, but am reconstructing the whole of my collection, and it is a pretty hectic job making rockeries as I cannot employ labour for this work, as nobody understands it according to my ideas.

"One of your correspondents wrote an article about Echeverias and Cotyledons, etc. Is it not possible in parts of England to grow these out of doors, in elevated beds with plenty of drainage and cover with waterproof blinds? I have just finished a new bed 30 feet long for my Mesembryanthemums, and 8 feet wide, wire netted in with $\frac{3}{4}$ inch mesh to keep birds out, also large shell-back snails, and the whole lot covered in with waterproof blinds made out of Italian hemp, waterproofed with linseed oil. They get all the sunshine they want, also protection, as many of these plants do not require any water as we have plenty of dew during the summer and winter and heaps of atmospheric moisture, generally about 70 per cent. I will be replanting this bed out next week, and must candidly admit I feel quite excited to set them out in an intelligent manner.

"Do you think plants could be grown outside under these conditions and protected from frost? In the South of England they do not always get heavy weather, and in fact I remember the last time I was in England I travelled all over England, and as far as Edinburgh, and never saw snow, or hardly a bare patch of ground. I dislike growing these plants in greenhouses if it can be avoided; to me it is like keeping birds in a cage."

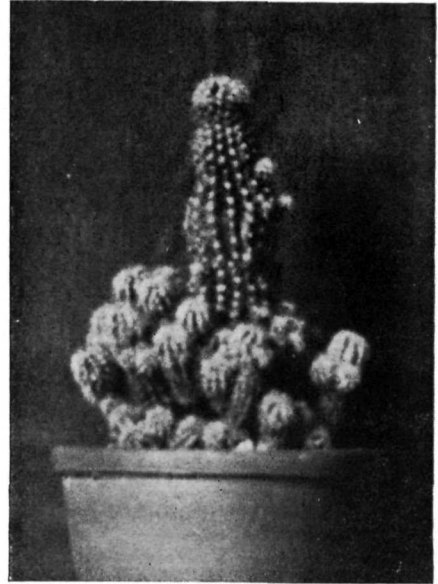
A series of photographs has just been received from Mr. Solomon showing the new bed he speaks of; one of these is reproduced here and shows the protective netting over which the waterproof blinds can be drawn, when required. The bed is backed on each side by 15-inch brick walls; these are used in preference to rocks, which would harbour snails, slugs, etc. Other photographs give closer views of some of the plantings, beautiful groups of Conophytum, Pleiospilos, Lithops, Crassula, Anacampseros, Haworthia and others.

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

Letter to the Editor

DEAR MADAM,

The enclosed photograph of one of my cacti may interest your readers of the JOURNAL. The plant was "discovered" by my brother, Capt. E. King, of Oxford, in a cottage near Oxford. (Oxford cottages, by the way, are rich in ancient cacti and succulents.) When my brother obtained it last May, it was in



a dirty pot with a mere handful of still dirtier earth at the bottom, out of which appeared a few straggling roots. There were about half a dozen heads on the plant which had been fearfully neglected and according to the old lady of the cottage she watered the plant "sometimes," and she had had it for over fifteen years. After a thorough clean up à la Endean (with water, paraffin and clensel), it was set in burnt clay. In less than a fortnight it began multiplying "heads," and now in September it has sixty-nine large heads and numerous tiny ones springing to life all round. I am told it is *Echinopsis Zuccarinii* Pfeiff. (1839), i.e. *tubiflora*, and it certainly corresponds with Berger's description at p. 188 of his "Kakteen," but I should like confirmation (or otherwise) if this is possible.

Yours faithfully,

W. G. KING.

Exhibition of South African Wild Flowers

ON October 24th and 25th, in the Royal Horticultural Society's Old Hall, was held an Exhibition of South African Wild Flowers, under the auspices of the Government of the Union. Mr. A. W. van den Houten, Director of the Municipal Parks and Gardens at Cape Town, accompanied the consignments, and was responsible for the arrangement of the exhibits in London.

A beautiful panorama of Table Mountain formed an excellent background, and the plants were arranged partly in small natural groups amongst rocks in island sites about the Hall and partly on tables. The variety and colouring of the many *Proteas*, *Ericas*, *Helichrysums*, etc., together with great branches of the Silver Tree, *Leucadendron argenteum*, were very impressive; the flowers were in wonderful condition, despite their long voyage, and if to some people the curious papery texture of many was reminiscent of "everlastings" not much in favour with this generation, the botanical interest was very great. One annex was filled with specimens, each having the botanical name and place of origin attached.

The plants that were of most interest to members of this Society were the succulents, of which a large and varied collection had been sent. The large specimens were incorporated in the groups and were planted amongst rocks as they would be found growing in nature. There were a large number of *Aloes*—87 out of about 120 known species—some of them, such as *Aloe plicatilis* were fine specimens; some were in flower. Perhaps the most striking succulent plants in the rock groups were those of *Euphorbia caput-medusae*. This plant is familiar to most growers of succulents and many a cottage window proudly displays a plant with long, thin, pendent stems, up to a yard or more in length. It will therefore come as a surprise to many people to see the form of these plants in their natural habitat. One specimen measured about 2 feet 6 inches across, the diameter at the collar below the branching crown being about 10 inches. There were roughly 200 branches, the average diameter of the full grown ones being $1\frac{1}{2}$ inches; these were so arranged that they grew horizontally from the main stem, turning upwards for the last few inches so that all the heads were eventually more or less on a level and closely packed together. Incidentally most of the specimens were covered with fruit. Beside

them were some very fine specimens of *E. clandestina*, the tallest being nearly 2 feet high and 4 inches across.

On side tables was a very interesting series of plants in pans and pots sent by Kirstenbosch, by the University of Stellenbosch and from the private collection of Dr. Luckhoff of Cape Town. The latter was responsible for some pans of mimicry plants shown surrounded by the stones amongst which they naturally grow. One pan showed four varieties of *Titanopsis* in all the beauty of their natural colouring produced under an African sun; *Conophytum*, *Lithops*, *Anacampseros*, *Bijlia*, *Faucaria*, *Pleiospilos*, *Argyroderma*, *Haworthia*, *Gasteria*, and *Euphorbia* were amongst the genera represented. In most cases the names were given on accompanying descriptive labels, but it was not always easy to see which name belonged to which plant. The genus *Anacampseros* was represented by at least nine species: *A. papyracea*, *rufescens*, *crinita*, *Meyeri*, *avasmontana*, *parviflora* var. *Poelln.*, *altissima*, *Alstonii* and *Herreana* var. *Poelln.*; amongst the *Crassulas* were *C. teres*, *cornuta*, *corallinii*, *Alstonii* and *deceptrix*. The *Euphorbias* were represented by *E. stellaspina*, *horrida*, *meloformis*, *obesa*, *acerosa* as well as *E. caput-medusae* and *E. clandestina* already mentioned.

Various *Stapelias* were shown in pots, as well as examples of *Duvalia*, *Trichocaulon* and *Piранthus*. There was one little *Stapelia*, a group of four or five shoots, about 3 inches high and very beautiful in colour and marking that probably excited some covetousness, but unfortunately it was unnamed.

It was altogether a notable occasion and succulent collectors are very glad to have had the opportunity of seeing plants, with which they are familiar, fresh from their native haunts; the serious student may have wished that the naming was a little more complete, but to anyone unfamiliar with these curious and fascinating little plants this exhibition offered an excellent display guaranteed to excite interest and curiosity. And the most blasé collector cannot fail to have been impressed by the *Euphorbia caput-medusae* and the clump of *Gibbaeum pubescens* a foot across.

At the close of the exhibition the flowers were taken to South Africa House to be displayed there; the succulent plants have been sent to Kew, where they will be on view.

A Note

WHEN a plant fresh to me arrives, I like to trace out something about the species in books or catalogues that may be available. This week I have been looking up a plant which arrived under the name "*Mammillaria Blossfeldiana* (a new species Gates No. 144) described in the *Amer. Cact. and Succ. Jour.*, May, 1933." It is a nice little species and has thrown out a beautiful flower since in my possession.

Consulting the above Journal, I find that Gates is not the original describer. While he was the discoverer of the species and sent it out to his correspondents in 1931, he only redescribed it in the American Journal, but he placed his own name to it. The species was first described by Bödeker (wrongly spelt Bodeker by Gates) in the *Monats. Deutsch. Kakt. Gesell.* for September, 1931 (!), p. 209.

Gates excuses himself for redescribing the species by saying that it was placed (by Bödeker) in a genus not recognised outside Germany. To me this reason seems nonsense. If the species was described even inadequately the prior describer is undoubtedly Bödeker. Gates uses the genus *Neomammillaria*, Br. and R., but is this correct? Blossfeld in his catalogue also accepts this genus.

Referring to Berger, *Kakteen* (1929) we find that he follows Schumann, *Gesamt. Beschrb.* (1898-1903) in subdividing the genus *Mamillaria*, Haw. into two subgenera, *Dolichothele*, K.Sch. and *Eumamillaria* Engl. Britton and Rose followed this division raising the former name to the status of a genus, but, strange to say, would not accept the latter, but introduced, without any apparent reason, a new genus name *Neomammillaria*, for the same group of species as Schumann grouped under his sub-genus *Eumamillaria*. Now that *Neomammillaria* has been officially discarded, surely the official name *Mammillaria* should be used for this section, containing the bulk of the old genus *Mamillaria* Haw. of which K. Schumann was the "first reviser" in cutting off the *longimamma* species under the name *Dolichothele*. If the official name *Mammillaria* be not used, then *Eumamillaria* seems to be the correct genus name.

NOTE.—The genus *Mammillaria* (*Eumamillaria*) is left with about two hundred species. One cannot grasp so large a cohort in one's mind and naturally groups the species into smaller sections, each containing species of closer resemblance to each other, e.g. *candida*, *lenta*, *Baumii*, *lasiacantha*, etc. Schumann

thus made divisions, which Berger has followed and perfected, making ten sections, a great help to the student.

HY. J. TURNER.

Editorial

AT the end of the year it may be permitted to consider the Society's progress. The membership has continued to increase steadily, which is very encouraging. The Hon. Secretary has received many letters which seem to show that the Society is of real use to people growing cacti and succulents, whether in stimulating interest or answering questions. Correspondents overseas are showing considerable interest in the Society, and we are always glad to hear from them; the different methods of cultivation that different climates demand are always worth hearing about and we welcome any such accounts, as well as descriptions of the plants in their native haunts, from people who live near them.

The Cactus Exhibition, while serving to show what plants members are cultivating, also helped to bring our activities before a wider circle and we are grateful to the notices in the press. But still there are many people who have not heard of the Society, and we hope that every member will help to make it more widely known.

The JOURNAL has had a most encouraging reception; it goes regularly to India, Africa, Australia and America, as well as to Continental Countries, and we hope that every reader will regard himself as a potential contributor and send in notes of any interesting points he may come on. Please also send suggestions and criticisms, so that the JOURNAL may fulfil the requirements of as many people as possible.

As regards succulents, we are very proud to have contributions from Dr. N. E. Brown, of world-wide reputation; for information about Cacti we still have to go abroad and, while we are very grateful to the assistance we receive from many sources, we should like to see an English botanist take up this interesting family of plants. If any botanist is looking for a suitable subject on which to concentrate his energies, we would like to suggest that there is still much work to be done amongst the Cacti.

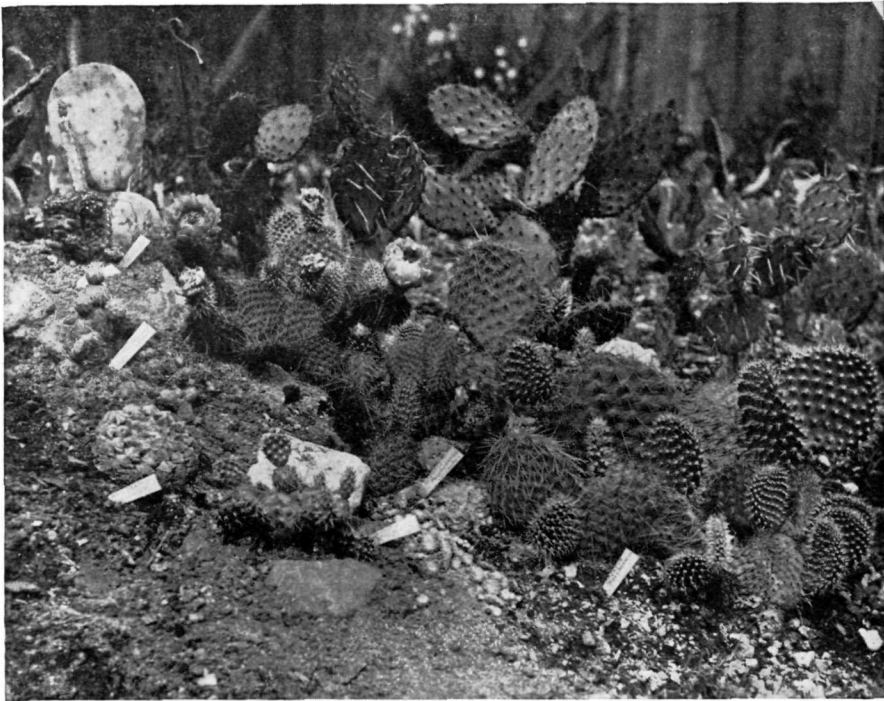
Before the JOURNAL appears again we shall be well into a New Year. May we therefore take this opportunity of sending to our Sister Societies and to all cultivators of cacti and succulents our best wishes for 1934.

Cactus in Canada

By C. W. Armstrong

THERE are many who may think that we are too far north for cacti to be found growing naturally with us, but we have three varieties growing profusely in the dry belt valleys of British Columbia and the plains of Alberta, and just lately a new one, which I have identified as *Opuntia rhodantha*, whose reported habitat is Colorado and Utah of the United States, was found growing around Buffalo wallows at Fort St. John on the Peace River in latitude 57; this is so far north and so far beyond the

front of the white stone, is a small form that is found on the banks of the Thompson River from Ashcroft to Kamloopo, B.C.; in the centre is a medium form in flower, with a larger one at the right; both of these are found in the coulees on the banks of the Saskatchewan River near Lethbridge, Alberta, and often form large patches. I first became acquainted with cacti many years ago through violent contact with this variety; I was thrown over a horse's head right into the centre of a very large patch of it when my



Opuntias in Vancouver, B.C.

range of cacti that I can conceive of only one way in which it could have got there, and that is tangled in the hair of the buffalo; the south bank is pitted with their wallows, and in their rolling it became detached and consequently took root and has spread along the bank, but it is found only at this location. In form it is half way between *Opuntia fragilis* and *Opuntia polyacantha*, but the flowers are red; in the accompanying illustration it can be seen at the left just behind the *Ariocarpus*.

The illustration shows three forms of *Opuntia polyacantha*; in the foreground, in

horse stepped into a gopher hole. I never thought at the time that I would have become such an ardent "cactophile" as I am, but it certainly got into my blood. In the same locality, but back from the river on the plains, is found *Coryphantha vivipara*, which is rather hard to locate as it grows flat on the surface almost smothered by prairie grasses. When I first found it, it was in fruit; these were the size and flavour of gooseberries, smooth and spineless.

Opuntia fragilis is found very abundantly in the dry belt sections of British Columbia, forming enormous beds, but it is usually shy

of flowering in cultivation, even in nature it flowers best in the most arid situations.

All of the above remain out in my rockery all winter; it is usually very wet with occasional frost, which lasted nearly a month this year, with as much as 15 degrees of frost. I find that a sheet of glass keeps them in good condition, otherwise they get very soggy. Unfortunately I have no greenhouse, so have to carry the other (about two hundred) varieties up to an attic, which is fairly well lighted, and as I have learned the lesson with grievous loss, they now get no water from October to May; with the result that I have no casualties whatever. The first year that I stored them there I could not resist the temptation of watering and lost about half of my collection; now many of them are not even potted up, just heeled in or loose in flats.

I planted them out on May 1st this year, but it was really a month too early, as we had much rain with cold nights, so many of them, especially flat-leaved *Opuntias* got badly scarred; but they are now recovering and many are in flower or bud.

Meetings

ON October 24th, Herr Curt Backeberg showed a film of "Cactus Hunting in the Andes," before a large and enthusiastic audience, despite the fact that the meeting started late owing to the film having been detained by the customs.

The film began in Hamburg, showing the cultivation of cacti in frames and houses; then came the departure from Antwerp, passing up the Panama Canal and the arrival at Guayaquil, the first harbour on the West Coast of South America. Lima, the capital of Peru, was the starting point for the ascent of the Cordilleras, and a wonderful panoramic effect of the rise to Tiglió, the highest railway station in the world, was given. On arrival a snow storm was in progress, the photographic representation of this storm being particularly effective; amongst the melting snows were found the first cacti, *Opuntia floccosa*. Later *Echinocactus peruvianus* and *Cereus melanostele* were encountered. The town of Arequipa, "the White City," was visited and from thence the two volcanoes Chachani and Misti, 6,000 m. high, were reached, then on across high tablelands to Cuzco. Cuzco was built by the Spaniards on old Incan foundations, the most picturesque town in South America, which still preserves

its ancient character in its entirety—even though a child was playing yo-yo in its streets. The pictures in the Incan ruins were remarkable and one felt that the Indian in his striped blanket, who moved across the screen, now sitting on the "throne of the Incas," now slipping amongst the stones down ancient stairways, now demonstrating the "slide" which is all that is left of the Rodadero or Council Chamber, must have had in him some of the blood of those early Incas who could build their marvellous fortresses so many ages ago, such quiet dignity was there in his bearing.

The oldest of the mountain fortresses is Machupichu and new cacti were found here; and then Lake Titicaca was reached. Here the famous boats made of rushes—balsas—were shown and the primitive method of raising the sail, made also of rushes. And then on to La Paz amongst desolate surroundings, where beautiful columnar cacti were found, *Cereus fossulatus* and *C. melanostriatus*, some with crested heads. The grandest regions of South America, across the Bolivian-Argentine boundary were reached and wonderful views with clumps of *Cereus Werdermannianus* and *C. Trollii* were shown, and next the district where *Cereus pasacana* makes a striking feature in the landscape.

The film gave a very complete record of the trip; the wild and desolate regions where many of the cacti grow and the difficulties of collection and transport in such places were well shown; the method of collecting and drying seeds and of collecting grown specimens of various types was very interesting, and the stay-at-home cactus grower who saw the film will have an excellent impression of the work involved in acquiring the "imported cacti" that he adds to his collection. Herr Backeberg is to be congratulated on a very fine achievement.

Meetings in 1934

THE following are the dates of the monthly meetings for the coming year; notice of the subject to be dealt with will be circulated to each member as usual. Please note that January 23rd is the date of the Annual Meeting and dinner, and that the Exhibition will be held on July 24th.

January 23rd.	July 24th.
February 20th.	September 11th.
March 20th.	October 23rd.
April 17th.	November 27th.
May 8th.	December 11th.
June 12th.	

Root Systems of Desert Plants

By V. Higgins

(Read at the meeting on September 12th, 1933)

BEFORE considering the special adaptations of the roots systems of desert plants necessitated by their unusual environment, it may be as well to review briefly the normal structure and action of roots. The root is the organ by means of which a plant is able to take in salts in solution from the soil in which it grows. Roots vary in length enormously but the only part that is capable of absorbing liquid at any given times is near the tip; the greater part is covered with a corky layer through which water does not penetrate, and the internal structure is such that the liquid absorbed by the tip can be rapidly carried to the plant body.

The tip of a root is the growing region; it consists of very delicate cells which are constantly dividing; to protect the tip as it pushes its way through the earth is a structure known as the root cap; this consists of a mass of cells covered with a corky layer which is gradually worn away as the root burrows; fresh layers are added to the root cap by the growing point of the root itself. Just behind the root cap the outer layers of the root proper are thin walled and the cells of the outer layer form hairs; these root hairs are the most important part of the root, as they alone take up water and the food substances contained in it. These root hairs are very noticeable in seedlings but are always present on active roots; each hair lasts for a day or two only and is replaced by others as the root pushes forward. The degree to which root hairs are developed depends on the difficulty of obtaining water; in a dry soil root hairs are produced more freely than in a wet one.

Roots take various forms which are directly related to the plants they support. Thus plants with tap roots have their leaves so arranged that any water falling on them is conducted towards the centre of the plant. Plants with spreading leaves and branches have fibrous roots spread out to catch water over a wider area; in forest trees the roots will be found to spread under the ground to the same distance as the branches spread above so that the water drips off the branches on to the soil where the tips of the roots can make most use of it.

The absorption of water by a plant cell is only possible if the cell wall is very thin;

as soon as the wall is thickened by the addition of extra layers or rendered corky by a chemical change, the cell becomes incapable of taking in liquids. The process by which solutions are absorbed is known as osmosis and depends on the principle that salt solutions tend to become equal in strength when separated only by a semipermeable membrane. Hence, if the sap in a cell consists of a stronger solution than that which surrounds the cell, water will tend to pass through the cell wall until a balance is obtained. In actual fact the process never reaches a state of balance since the cell in contact with the exterior solution touches on its other sides cells similar to itself, where the interchange of solutions goes on till the water acquired from outside reaches the conducting system of the root and so passes up into the stem and leaves.

Only weak solutions will pass through the cell wall and from these must be obtained all the substances, with the exception of carbon, that are required for growth; it follows that a very large quantity of water must be taken in by the root system to provide enough food material; the surplus is given off by the leaves in the form of water vapour.

Soils vary very much in composition but the substances necessary for plant growth are usually present, though in varying amounts. The size of the particles is more important than the chemical composition, for on this depends the amount of water that a plant can extract from the soil. In clay, where the particles are very fine, only a small amount of the water present can be absorbed by the roots, whereas in a sandy soil, where the particles are larger, almost all the water present can be utilised. The reason for this is that the water between the particles is not available, but there is a film of water which is held by capilarity closely round each particle and this is the form in which the roots can take up water most readily. When the root hairs withdraw this film of water from a particle, the film is replaced by water from an adjoining particle and so on, thus the plant can collect water from a considerably greater area than the roots actually cover. Surplus water between the soil particles is useless to the plant; such a soil is water-logged. For healthy

growth the presence of oxygen is necessary ; it is probably not absorbed by the roots to any great extent, though a little will pass through the lenticels or breathing pores in the corky covering of old roots. But if air (which of course contains oxygen) is not present in the soil, many necessary chemical processes are hindered, useful bacilli cannot live and the soil develops acids and becomes "sour." The presence of air in the soil is quite as important as the presence of water. Experiments have shown that if oxygen is entirely removed from the soil, root growth ceases entirely in all species of plants ; some species grow very slowly if 0.5 per cent. oxygen is admitted, but a much greater supply is required for normal growth by the majority of plants. Such plants as *Juncus*, the rush, which occur in boggy ground are able to maintain a slow rate of growth where the oxygen supply is very low, but *Fouquieria*, *Opuntia*, *Mesembryanthemum* and other plants which normally grow in loose, sandy, well-aerated soil are very intolerant of a shortage of oxygen.

The extreme conditions that exist in desert regions have necessitated considerable modifications in the structure of such plants as are able to live there ; these modifications are due to two main causes—the shortage of the water supply and the high temperature. The latter chiefly affects the plant body ; where plants have shallow roots these will be at a temperature approximating to that of the plant itself, but the temperature decreases at lower levels so that a deeply-rooted plant may have a considerable temperature gradient between its lowest roots and the shoot. For all plants there is a minimum temperature below which growth ceases, an optimum at which it is carried on most freely, and a maximum above which growth is again inhibited. These three temperatures vary not only for different species of plant, but also for the root and shoot of the same plant, being generally lower for the root than for the shoot.

The second factor that materially modifies desert plants is the water supply. Not only is there a great scarcity of available water in the soil but the air is so dry that evaporation is enormously increased. In some deserts the annual rainfall may be as much as fifteen inches, which in a temperate region might be sufficient to support a normal vegetation, but the extreme dryness of the air and the high temperature makes this amount quite inadequate.

The adaptations of the plant body to meet

desert conditions are familiar to all growers of cacti and other succulent plants ; the thickened cuticle, reduction of leaf surface and storing of water are the chief means of protection. But the roots of desert plants must also play their part. In a moist soil the root system will be only moderately developed ; in a bog the roots branch, but root hairs are not developed to any great extent ; the lack of air is the chief difficulty for bog plants, resulting, in extreme cases, in the development of pneumatophores—roots which grow up out of the soil into the air, as in the Mangrove. The soil in most desert regions is usually sandy and open and the oxygen supply presents no difficulty ; but to obtain sufficient moisture the root system must be extensive, much branched and with a free development of root hairs.

It has been mentioned that water is absorbed through the cell wall by the process known as osmosis ; the ability of a plant to take in solutions is measured by the osmotic pressure and is dependent on the concentration of the cell sap ; if this is high the osmotic pressure is said to be high and the plant is therefore able to extract more water from the soil than one with a low osmotic pressure. It is typical of non-succulent xerophytes (plants adapted to a shortage of water) that the osmotic pressure is abnormally high ; this, coupled with an extensive root system, enables the plant to obtain sufficient water for its needs. Investigations have shown that typical desert plants, such as the Mesquite bushes of America and the Acacia scrub of the African deserts have wide-spread, much branched root systems.

A common fallacy is that desert plants must have extremely deep roots, so that they can reach the water table, the level at which standing water will always be found. This may be the case with such plants as grow in soils, arid during a portion of the year only, but which become swamps or stream beds during the rainy season. A plant of *Prosopis juliflora* near the Amargosa River in California is reported to have had a main root running downwards for fifty feet. But as a rule the water table is several hundred feet below the surface of the desert and quite inaccessible ; besides, after the slight moisture of the upper layers due to showers, the soil becomes increasingly drier for some distance so that there is no incentive for the roots to push further in that direction.

When we consider succulent plants we find that different conditions occur. Instead of the high osmotic pressure of typical

xerophytes, the osmotic pressure of succulent plants is abnormally low, lower even than that of plants growing in normal situations. It is interesting to note that even lower osmotic pressures are found in epiphytes, plants which grow on trees and shrubs so as to be nearer the sunlight, but have no organic connection with their hosts; such plants depend for their water supply on intermittent showers and must make provision for the dry periods intervening. Epiphytic orchids are typical examples; these store water either in stems or leaves or in special forms of stem known as pseudo-bulbs. This similarity between succulent plants such as the cacti found in the desert and true epiphytes is interesting, for the cacti which grow in tropical forests are often epiphytes and it is generally considered that the desert types have been evolved from these.

It is sometimes thought that cacti do not have many roots; in fact an article appeared in one of the daily papers where it was stated that cacti flourish in arid regions "despite the scantiness of root, which is one of their chief characteristics"! This misconception probably arises from the fact that cacti are able to exist for long periods on the reserves stored in them; a case is recorded of a cactus which was kept for two years in a museum case in dry air at a constant temperature, yet on being placed in congenial surroundings, the plant was able to put out roots and start into growth once more.

Every amateur grower has had specimens that have sat for months, neither dying nor growing, but just existing; yet when a favourable moment comes they will put forth roots and begin growing again. The fact that we are not always successful in inducing root growth in cultivation does not mean that in their natural habitat cacti do not make large root systems. Investigations carried out by Dr. W. A. Cannon at the Desert Laboratory at Tucson yielded interesting results. The root system of an *Echinocactus Wislizenii* was carefully uncovered and its ramifications traced out. The plant itself was about 25 inches high and 14 inches in diameter; three main roots sprang from the base of the plant at about 4 inches from the surface of the ground; these spread out fairly evenly in all directions and branched very considerably, the branches being, as a rule, slender. The average depth of the roots below the surface was $2\frac{1}{2}$ inches; where a stone was encountered the roots dipped below, probably attracted downwards by the greater moisture on its lower and cooler surface, but they rose again on the other side. The greatest distance

to which the roots could be traced was over 10 feet from the base of the plant.

The roots of a small *Cereus giganteus* were also traced out. The plant was about 3 feet high and had four main roots. One of these struck vertically downwards and could not be measured; a plant growing to the height that this *Cereus* normally attains, might be expected to have deep roots to counterbalance the height. The other roots ran horizontally about 3 to 4 inches below the surface, but could not be traced at a greater distance from the plant than 3 feet, as they were then extremely thin and fragile.

The fact that the root system of a single plant spreads over so wide an area results in the characteristic feature of deserts, namely, the distance between the individual specimens; arid districts are always sparsely covered with vegetation, and though a species may be represented over an area of many acres, the separate plants may quite likely be a yard or more from each other. The ground between them may be either bare or inhabited by a different species drawing water from a different level.

The root system of a *Cereus giganteus* in relation to other species growing near it was investigated by Dr. Cannon. The cactus had growing near it *Larrea tridentata* (the Creosote Bush) and *Parkinsonia microphylla*. The *Cereus* was a vigorous plant about 4 feet high; the root system consisted of a tap root and strong laterals; the soil consisted of a layer of adobe clay with boulders in it, about a foot thick, below which was an 8-inch layer of caliche; this is a calcareous formation which occurs in many parts of the desert, occasionally on the surface but generally covered with a layer of earth; it is almost impervious to water but is generally traversed by small holes through which roots find their way. The caliche in the instance under consideration was lying on solid rock. The main root of the *Cereus* penetrated the upper layer but stopped at the caliche; the lateral roots were extended for as much as 17 feet, but were in the upper layer only, and usually within 4 inches of the surface.

The *Parkinsonia* growing along side had rather deeper lateral roots, which ran obliquely through the upper layer, penetrated the caliche and finally travelled along the surface of the bed rock. The creosote bush had side roots running chiefly in the upper adobe layer but deeper than those of the *Cereus*, being usually over 6 inches from the surface: later they also penetrated the caliche and finally reached the rock. As far as the root systems of these

plants were traced out there was only one point found at which the roots actually touched each other; the soil was being most thoroughly exploited, but the plants did not interfere with each other in any way. The root system of this *Cereus* showed another feature characteristic of some cacti; it has been noted in certain *Opuntias* also. The main branches give rise to a tuft of rootlets which persist for a time only and then die off; sometimes the root will die back even further and the next season a fresh crop of rootlets is developed. In this way the plant is able to re-work the ground, as it were.

The very shallow arrangement of the roots in many cacti is largely the result of the small rainfall, but it is probable that it is also due to the fact that these upper layers are better aerated; full investigations have not been carried out on the need for aeration of cactus roots, but since the respiration of the plant itself is considerably reduced below normal, the aeration of the roots is doubly important.

We have so far only considered those plants which have a system of fibrous roots, but the storage of water may be undertaken by the root as by the stem. Thus the branches of *Peniocereus Greggii* are moderately succulent, but the tap root develops to an enormous size like a parsnip, and examples have been found weighing as much as 100 lbs. The genus *Wilcoxia* has tuberous roots rather like a Dahlia, supporting the slender leafless stems. In several cacti such as *Ariocarpus* and *Lophophora* the base of the plant merges into a thickened root stock and this occurs in other species also. But an unusual form is found in at least two *Echinocacti*—*Thelocactus mandragora* and *Thelocactus subterraneus*; here the tap root is much enlarged and bears above it a short woody stem which in turn carries the succulent plant body; the intervening portion of woody stem is unusual.

It is only natural that the stem and leaves should have attracted more attention than root systems; their unusual form having made them especially interesting objects of study. The roots, on the other hand, have as a rule only been noted when they assume an extreme form. Experimental work has already been carried out on roots, but much remains to be done if the physiological condition of the plant is to be fully understood. For though the interest and beauty of a plant is centred in the stem, leaves and flowers, these organs cannot reach their full development without proper root action.

And from this we may draw a moral for our methods of cultivation; if we want the shoot

to grow to the best advantage we must make sure that the roots are suitably provided for. One of the chief dangers in growing plants in pots—and though this applies more especially to cacti and other succulent plants, it should also be taken into consideration for all pot plants—is overwatering. If the water poured into a pot can drain right through and be carried away, there is little danger; the soil particles will take up what they can and when each has its film of water, the plant can get what it wants; but if the pot stands on the staging so that water is held in the soil, then the danger that the valuable air spaces between the particles will be choked is always present and a very good chance that the soil will become “sour,” and the roots unable to do their work in the absence of the necessary oxygen.

Notice of a New Publication

THE greatest trouble of the serious student of cacti is the lack of available literature on the new plants that are being introduced. Many people will therefore be glad to hear that Herr Curt Backeberg is publishing on January 1st, 1934, the *Monatsblätter zur Kakteenkenntnis*. This work will appear monthly and each part will deal with about eight species; the descriptions will be in English, French and Dutch, as well as in German, and each description will be accompanied by a photograph. This publication should be a very valuable assistance to everyone interested in the correct naming of the new importations, and also of older species which are not well known.

Mrs. V. Higgins, Herr G. D. Duursma and M. van de Weghe will assist with the translation into English, Dutch and French respectively.

The price will be RM.4.20 per year, for twelve parts, post free. Arrangements have been made to supply these in England through Mr. W. T. Neale, of Newhaven, at 6s. per annum, post free.

A report of the discussion on “Soils,” which took place at the Meeting on November 7th, will appear in the next number of the JOURNAL—in time to give members new ideas for potting in the spring.

Lobivia Higginsiana Bckbg.
ns.p.



PLANO-GLOBOSA, ad 10 cm. diam., griseo-olivacea, vertice depresso glabroque, costis ca. 15-17, carinatis, planis securiformibus elevationibus praeditis. Areolae sublanuginosae, ca. 2.2 cm. distantes. Aculei juveniles rubro-brunei, supra verticem contexti vel lateraliter torsi. Radiales ad 10, brevissimus deorsum directus 6 mm. longus, 2 superiores laterales 4.5 cm. longi maximi. Centralis 1 (interdum 2), ad 7.5 cm. longus. Flores 6 cm. longi, tubo 3.5 cm. longo, flavo-viridi, sulcato, squamis roseo-viridibus pilisque bruneis praedito, intus flavo-viridi. Sepala angusta, rosacea, petala paulum obscuriora, basi flava, 8 mm. lata, cuspidata. Stamina in 2 series ordinata, albo-flava. Stigmata 8, viridia. Fructus ignotus.

Occurrence : Near Lake Titicaca (Bolivian side).

Habit : Large, flat, many-headed groups.

Plant body : Depressed-globose, individual heads up to ca. 10 cm. diameter, grey olive-green to olive green.

Ribs : Ca. 15-17 with sharp edges, hatchet-shaped protruberances but low, crown sunken and bare.

Areoles : Slightly woolly and ca. 2.2 cm. apart.

Radial spines : Up to ca. 10 in number, the shortest approximately 6 mm. long, directed downwards, the two longest upper laterals ca. 4.5 cm. long.

Central spines : Only one can be distinguished clearly, up to 7.5 cm. long, another often occurs at the areole also, rising obliquely, sometimes the radial spines encroach inwards.

All the spines when young are reddish brown to wine red, very flexible and interlaced over the crown or adpressed laterally.

Flowers : Total length 6 cm., tube ca. 3.5 cm. long, bright yellow green, sulcate, with pointed pinkish green scales and dark brown hairs. Outer small involucral leaves rosewood coloured, inner ones similar at the edge but darker in colour and becoming yellowish at the base, inner tube pale yellow-green. Floral leaves 8 mm. wide, pointed.

Stamens as in *Lob. rubescens* united at the base of the tube in two series at the upper edge of the tube arising from a yellow green envelope, colour pale yellow. Stigmas 8, greenish.

Fruit : unknown.

Distinguished from the other *Lobivias* of the Bolivian highlands by the interlaced spines.

Members of the Society will be interested to hear that Herr Backeberg has named two of his new discoveries found during the 1933 Expedition after Mr. W. T. Neale of Newhaven—*Mila Nealeana* and *Lobivia Nealeana*. Through the kindness of Herr Backeberg we are permitted to publish the description and photograph of *Lobivia Higginsiana* which the Editor is very proud to have had named after her; this description will be one of those included in Herr Backeberg's new publication, *Monatsblätter zur Kakteenkenntnis*, of which particulars are given on another page.

Annual Meeting and Dinner, 1934

THE Annual Meeting of the Society will be held on January 23rd, 1934, at 6 p.m., and will be followed by a dinner in the Restaurant of the Royal Horticultural Society's New Hall. Details will be sent later, but it is hoped that members will make a note of the date and keep it free.

Report of the 1933 Expedition

By Curt Backeberg

(Continued)

Alwin Berger says in his Foreword to the *Lines of Evolution*, etc. : " It has been obvious to me since 1905, when dividing up the genus *Cereus* that the large collective genera obscure the understanding of the evolution of the family rather than clarify it," and again " I did not venture to raise them (the sub-families) to genera out of regard for the cactus-growing public, although I was quite convinced of their validity, for similar groups in other families are regarded as genera without question"; and then later on Berger says: " The new genera have the advantage that they allow the whole development of the family to stand out, stereoscopically as it were." Was Berger right in his " regard for the cactus-growing public"? Anyhow the amateur has to remember hundreds of specific names, so a couple of genera would hardly make more difficulties. And with the Mesembryanthemum species, a crowd of genera have been set up and unhesitatingly accepted, although doubtless they are no more warranted than the cactus genera. But many of these are already in use by the amateur. Is it not obvious that he can also remember the few others, so far as they concern him! And is it not an indefensible position that in some countries everything is named according to the genera and in others collective genera are used. When will the essential uniformity be achieved? The cacti are one of the most interesting families in the world and just for this reason, uniformity should be achieved. The arguments against separate genera are untenable, those for them are so much the greater. What force and life there is in the system of the natural lines of evolution, whilst the " condensed " collective genera " obscure the understanding."

If therefore one considers my West Indian theory with the appropriate divisions into regions of development, then the rest will put an end to the obscurity of the *Lines of Evolution*; the two large northern and southern groups of *Echinocacti*, with their lack of homogeneity, may be considered as having arisen from similar ancestors, and all the remarkable genera like *Mammillaria*, *Echinocereus*, *Ariocarpus*, *Anhalonium*, etc., with which, if one accepts the evolution from a single South American source of origin, one does not know what to do, may be

satisfactorily explained by assuming a branch from the West Indies caused by a natural catastrophe, the remains of their ancestors having disappeared without leaving a trace. Britton and Rose, as well as Berger, as the result of their great survey and knowledge of the newest material of the family have pointed the road we all must go. Why should we not follow?

The state of affairs hitherto existing is, in the long run, untenable. To-day we have a much better perspective of the whole series of South American genera than Dr. Rose had. We not only know far more *Lobivias* (Dr. Rose was not able at the time to spend long in Bolivia), but also far more *Cerei* from the high Andes, *Parodias* (*Hickenias-Microspermias*) and *Rebutias*. The last two genera especially have been much enlarged.

Here we must correct Fric's statement that *Rebutias* occur up to 5,000 metres. They are not found above 4,000 metres, but their occurrence at this height is astonishing enough, for it can be very cold here and my film will show how extraordinarily difficult it is to find the *Rebutias* growing at high altitudes. The *Rebutias* show more and more what a large group they are, which we can clearly subdivide according to collective characteristics. Thus there are yellow-flowered and self-sterile species (*R. aureiflora*) which approach *Lobivia* very closely. The many-headed, turnip-rooted kinds like *R. Steinmannii* and *pygmaea* form a separate group which apparently varies enormously in the spines, size and colour of the flowers. We must proceed with extreme caution here, in order to sort out the true species from amongst the many forms in cultivation, although, on account of the widespread distribution of the *Rebutias* in the highlands, I must admit that there is not much between them, as Rose said. In any case it seems to me that the *Rebutias* together with the *Fraileas* are the smallest end form of the cactoid branch of the cacti in South America, as *Mila* probably is of the cereoid forms; all spring from the *Trichocerei*, but are descendants of an unknown branch of ancestors, as Berger has suggested in Diagram 10 of his *Line of Evolution*.

Before I found the majority of the *Rebutias* I traversed a very beautiful cactus district—the almost tropical part of Bolivia. Here

Cereus Spachianus and *macrogonus* find their home, and not in Argentina, as is stated in the literature. Later I found again the long sought *Cereus Roezlii*; in this and *C. Herzogianus* n.sp., which I found near it, I am not sure that we have not a separate family, for the flowers are in close clusters and have no distinct sepals.

In the meantime the drought had set in and the showers and passing clouds were gone and blue sky spread continuously over the highlands. One day winter had set in completely. At night the thermometer fell to 10° below zero and the coldest period had not yet arrived. Under this extraordinarily steep temperature gradient (during the day it can be very hot still) grow most of the *Lobivias* and various *Rebutias*. Heat and cold apparently do not affect them. But it suggests that we should keep these species quite cool in winter, if we want them to flower, although the plants, on account of the conditions of cultivation, cannot be considered quite hardy with us. We can only reckon as hardy those species which are used to considerable moisture in their habitat, and these are very few indeed. The highland may be covered with hoar frost but otherwise it is completely dry. Therefore many species from the highlands are only suitable for planting out of doors in the summer. There are also *Opuntias* from the mountains which are flooded during the rainy period, for the high plateau is then a lake in parts! Our knowledge of the mountain *Opuntias* is still very imperfect. For instance, the beautiful *Airampoas* are nearly all thrown together as *Opuntia Soehrensii*, although they are quite distinct. *O. albisaetacens* n.sp. of similar form but remaining white, is especially beautiful. From a distance the slopes of the mountains often look as if covered with snow, so close packed are the plants.

The impression made by the wintry highlands is often overpowering. One day I rode southwards through the pampas. It was quite early morning and awfully cold. All around the flat country was covered with a light hoar frost, the puddles being frozen, and towards the horizon one could no longer see any tola, which nevertheless was growing to a great height. Beyond, as far as eye could see, rose the white summits of the western Cordilleras, and from the middle of the frosty pampas the snow caps looked to me like icebergs in an endless polar sea. It was for me a stroll through the wintry country, for nothing was to be found in such a district

except a few *Opuntias*, which apparently have quite unusual inclinations towards solitude.

But then, further south it became interesting again. Once, near Atocha, there grew a *Cereus Trollii* that was much larger and whiter, with fewer shoots, but these correspondingly thicker than the type. The groups are not nearly so bright as those on the Argentine boundary, besides having much thinner branches. Which are the plants that Dr. Troll found? There are at least two distinct varieties. And then I entered the district of the giant *C. Celsianus*. There are specimens which one could easily mistake for a *pasacana* and which have quite snow-white wool. My film shows some fastastically large specimens, near another Bolivian *Cereus* which is even larger than *pasacana*.

When we were approaching Argentina, on a fairly successful expedition of considerable duration, I found a wonderful *Echinocactus*, which is now showing beautiful red buds in cultivation and seems to be a *Neoporteria-Echinocactus Fidianus* n.sp. The spines are all colours from yellow to purple black, and the grey ribs are almost tubercled. A very attractive plant which has a small relation resembling an *Echinocactus mandragora* with the same swollen root. These are probably the representatives of the genus *Neoportia* which have pressed the furthest towards the east.

And now things happened in quick succession. More *Lobivias* were found, *Rebutias* and gorgeous *Parodias*. This genus is easily subdivided into those with straight and those with hooked spines, although Nature, in a frolicsome mood, has occasionally allowed exceptions. For instance, the straight-spined *Echinocactus Maasii* has three different varieties. But according to the type given the division is sound. Finally we must arrange the family as a whole and the occasional exceptions are to be regarded according to their range, whether they are really exceptions or whether on account of their extensive distribution, they are typical of the species. But these exceptions make one realise how little Nature cares for our classifications, and how much therefore, as a necessary evil of the classification we must give consideration to the caprices of Nature; this occurs especially with the division into genera, if we wish to produce a result that will be more or less satisfactory in the long run. The hooked-spined species of *Echinopsis* are being discovered in greater numbers and show that here too there exist transitional forms. From external examination such an *Echinopsis* can easily be taken for a *Lobivia*

if one did not see it in flower. To achieve an accurate classification much work is needed.

Any way, we have plenty of new material at hand and I am very sorry that it was not possible for me to cross the northern region of Chaco. I wanted to bring from thence the connecting link with *Neoraimondia*. And since for the reasons given this was not possible, I give below what is known about it. Many years ago Prof. Herzog found, on his journey through Bolivia, between Pulquina and Comarapa, a *Cereus* with lengthened areoles like those of *Neoraimondia*. I have a photograph of this plant; perhaps it could be published if Prof. Herzog permits. Mighty columnar cacti are also found here and these species, which are not particularly interesting to the grower, should nevertheless be of great interest to the scientist one day. Among the *Rebutias* I found one which, considering its kindred, was of almost gigantic dimensions. I saw one specimen 25 cm. long and 10 cm. in diameter, which unfortunately had been eaten by the *Rebutia* maggot; of this *R. Stuemeriana*, however, I brought some extraordinarily large pieces. It is worth noting that, like the cockchafer with us, the maggot appears in great numbers from time to time.

One of my last excursions resulted in the finding of a specially interesting *Lobivia*, *L. Drijveriana* n.sp. We had set up our camp at 4,000 metres, collected around this site and packed up, when towards evening a peon found, right shrunk into the ground, a plant almost 3 cm. in diameter. Though it was right in the middle of us, so to speak, no one had noticed it. But when we found one, we found still others the next morning. The interesting part of this plant is that in young specimens no central spine is formed, like *Coryphantha Werdermanniana*, and such plants with no central spine, look as a result quite different from the older specimens, which have fairly large, brownish or blueish black central spines, mostly curved. I brought examples of both forms since they are so extraordinarily different, for this phenomenon points a moral. If single specimens of these plants, exhibiting such differences, were sent over to different places then the result would be the description of two species. How often may this not have happened already!

As a result, one should not come abroad without the scientific knowledge of the collector; new species cannot be correctly described from one specimen, and this applies to the cactus species, for the list of synonyms shows how much muddle there already is.

Unfortunately the collector may be a kind of "field-worker," as C. E. Rost, so well expresses it in his article on "Brazil and its columnar Cacti," in the May number of *Desert*, 1933. But this depends on other things besides the collector. Here doubtless is something wrong and collectors themselves have told me that the neglect of their material, often collected at a financial sacrifice, has destroyed for them all interest in research on cacti. I consider it wrong that the new material is only dealt with at certain places, because nothing can be done with the many new discoveries elsewhere, or sometimes, because not enough is known of the subject. It should from the beginning of the new collecting movement, be seen to that the collector is armed with botanical knowledge and able himself to describe his species whenever necessary. Descriptions are not always drawn up by professional botanists, as the history of cactus study shows.

Perhaps also, people think that the period of new discovery will be short and quickly come to an end. But I prophesy that it will be a long time before we know everything and I still know many districts from which we may obtain a variety of things. Thus I have brought over *Austrocacti* for the first time which closely resemble the *Echinocerei*, but naturally have no relation with them. And so it is to be hoped many new things will follow still, to give us a new stimulus.

I hope I may be allowed to show my film of cactus hunting to a large number of amateurs, for it will give them not only a more or less complete insight into the home of cacti, between sea and mountain top, but will also show how extensive the whole working ground of the "field worker" has become owing to universal interest in collecting by numberless amateurs. And in this connection, may I ask for intelligent appreciation of the work of my colleagues, who took part as pioneers in the search for cacti—Ernst Stuemer, Friedrich Ritter, Hans W. Viereck and many others, so that interest in the new discoveries shall not be lost. The results which we achieve on our collecting expeditions we owe to the large company of collectors who first made it possible and who regarded the many new discoveries from the point of view of science, as the best result. Each individual grower may remind himself with pride of these facts, then we need not be afraid in the future of the progress of our amateur collectors towards the aim of a complete knowledge of the cactus family.

(Translated.)

An Amateur's Collection

I FORGET what it was that inspired me to make a collection of cacti, but I think it was seeing them in a local nurseryman's window. Anyway I bought a few and to these I added more and yet more, until at last I have about forty cacti and twenty succulents. This collection has not all been purchased by lots of dozens or half-dozens; several of the Phyllocacti have been given to me. When visiting about the parish I have frequently found that some very fine examples of these, as well as the Rat's Tail Cactus and a variety of Echinocactus, flourish in many a cottage window. Expressing interest and admiration at the way these plants grow, parishioners having entered into ecstasies at the way in which the plant flowers, the size of the blooms, the scent with which it fills the room and so forth, they usually say that I ought to have such a plant, and this ends in my coming away with a straggling piece of Phyllocactus hanging out of my pocket or the bag on my cycle.

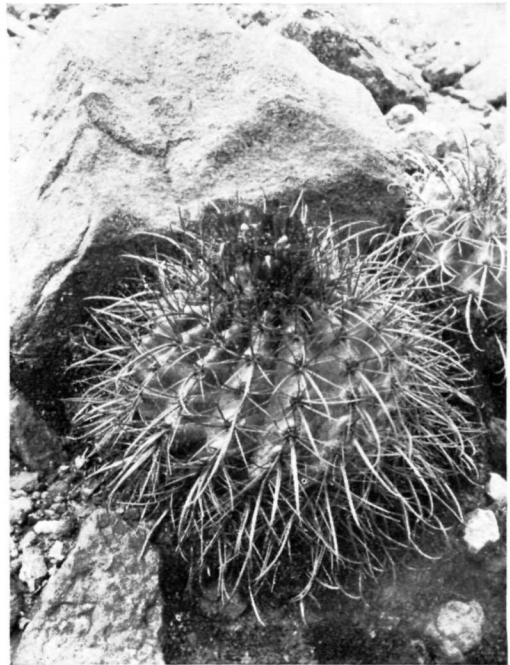
Two of these good-sized plants were left to me by an old lady at her death. I have some that I have raised from seed, and I think by possessing my soul in patience I shall value these as much as any, and my last lot of seedlings are looking very healthy and strong and give me much pleasure. In my fascination for these children of the desert I invite all kinds of people to come and gaze at their beauty; some remark "What curious little things," as though they were a species of reptile, others remark "Aren't they funny?" My wife likes the succulents, Echeverias, etc., but says she thinks the cacti are hideous, and a neighbour of mine, a retired Naval Commander, says that they are "heathenish"; all of which remarks go to show that the eye of beauty is not fully developed.

Yet I am convinced that there is a beauty about them, and as I look down upon my collection in an old greenhouse, which I know to be over a century old, I derive much pleasure from them. Their curious greens, in some pale, in others rich, in others a beautiful olive, to say nothing of the formation of their hairs and spines. To mention only a few, *Mammillaria stella aurata*, the rich golden hue of its spines, or *M. gracilis* with its arrangement of silvery hairs, or *M. plumosa*, a great favourite of mine, with its woolly tufts, or *Opuntia monacantha* with its great flat stems and strong-growing spines, or, for

something prettier, and shall we say daintier, *Opuntia microdasys* with its many little tufts. So one could go on finding pleasure in each individual species, knowing their good points and their bad points, watching them carefully, revelling in them when they greet us with their strange but wonderful flowers. To me there is something very attractive about a collection of cacti all carefully labelled and arranged in neat array, and I am inducing others to take up this succulent culture when and wherever I can.

REV. F. C. CHAMPION.

Echinocactus Maasii, Heese



Echinocactus (Malacocarpus) Maasii, Heese was first introduced in 1907. It comes from the highlands of Bolivia and North Argentine. The plant is bright green, spherical in shape, but elongating with age and sometimes becoming spirally twisted. The young areoles have abundant white wool and the honey-coloured spines are about $1\frac{1}{2}$ cm. long, about 10 at an areole. There are four central spines, one curved or hooked and about 3 cm. long. The buds are covered with brown wool and the flowers are a beautiful brick red. For the above photograph of a flowering specimen we are indebted to H. Winter, Frankfurt a.M.-Fechenheim.

Succulents

Other than Cactaceae and Mesembryanthemae

By R. S. Farden

WE all like to make as good a collection as we can of all succulents, and to get correct names, which is not too easy. I do not think it is advisable to jumble together all genera; it looks better and is more scientific to stage each genus apart from the others, and those genera side by side which are most nearly related; and also those species in a genus most alike side by side also. You are then able easily to compare them, instead of going to the other end of the house to find one similar to bring along to compare with it.

For cacti, we are getting fairly well off at last for literature in English, with Britton and Rose, Mrs. Higgins, Houghton, etc., and also there are very many German works. And for succulents there are, in German, A. Berger's *Crassulaceae*, and *Stapelien und Kleinen* and *Sukkulente Euphorbien*.

But for literature on succulents in English we are so badly off that I do not know of a single work of any kind, and one has to fall back on Nicholson's *Dictionary of Gardening* in eight volumes. It is in no way complete and is 40 to 50 years old, and very many new plants have been discovered since then, and the genera changed about.

So I have compiled for myself some notes drawn from various sources, principally Lemaire's *Plantes Grasses*, 2nd edition, 1889 (in French), Nicholson's *Dictionary* 1880-90 (?), Alwin Berger's splendid works, in German, alas (I say "alas" as I can read no German), *The Desert Magazine*, U.S.A., and the Cactus and Succulent Society of America's *Journal*. And I think it will be of some interest to those of us, like myself, who know nothing; to those I offer these notes, hoping they may interest and enthuse them to make better and larger collections and get more interest out of them.

Order CRASSULACEAE.

Latin *crassus* = thick, *crassulus* = a small thick-leaved plant. Notes from A. Berger's *Crassulaceae*, 1930. Alwin Berger, who has recently died, was the Curator of the Hanbury collection at La Mortola on the Italian Riviera.

Berger enumerates about 300 species of *Crassula* with an average of three varieties in each, say 900 plants. A good many he does not consider of greenhouse rank; those that are in cultivation he marks with an

asterisk. I propose to give the number in each genus and only to enumerate those with an asterisk.

Soil.—Lemaire says:—"Most succulents are fairly voracious and require a rich soil with humus. (Nicholson says humus is that black substance resulting from the decay of plants in the soil, also called vegetable mould, that is the soil at the bottom of the rubbish heap which we dig into our beds.) The drainage must be ample and complete and the soil made porous with coarse sand; also add Clay's fertiliser. A good plan to assure complete drainage is to stand each pot on two little pieces of flat wood a quarter of an inch thick (not over the hole). Many of us have a thoughtless habit of putting good drainage in the pots, then standing them on the staging, which prevents the exit of surplus water. Many of us have shingle on the staging and this allows free drainage.

A. Berger divides the *Crassulaceae* into six sub-families:—

- | | |
|-------------------|---------------------|
| A. Crassuloideae. | D. Sempervivoideae. |
| B. Kalanchoideae. | E. Sedoideae. |
| C. Cotyledoneae. | F. Echeveroideae. |

These he again divides into very many sections, some of which are again divided into sub-sections and a few of these are yet again divided into sub-sub-sections, seemingly rather complicated, but it leads to a better understanding of the plants.

Sub-family A. CRASSULOIDEAE.

This is divided into five genera:—

- | | |
|------------------------|-------------------------|
| A 1. <i>Crassula</i> . | A 4. <i>Rochea</i> . |
| A 2. <i>Pagella</i> . | A 5. <i>Vauanthes</i> . |
| A 3. <i>Dinacria</i> . | |

Genus A 1. *Crassula*.

These are nearly all from the Cape of Good Hope, with a few from Abyssinia and the Himalayas.

The flowers are small, white, yellowish or red and arranged in an inflorescence; the parts are usually in fives; the petals are joined at the base, the tips being free, erect or reflexed.

The plants are annual or perennial, either herbs or small shrubs. The leaves are always opposite, sometimes in a rosette, usually entire and more or less succulent.

These plants usually flower in alternate seasons.

A. Berger enumerates 251 species, giving the authority for the name and the country of origin. The following are those he has marked with an asterisk as being in cultivation.

They are divided into seven sub-sections :

- A 1a. Tillaeoideae. A 1e. Sphaeritis.
 A 1b. Stellatae. A 1f. Globulea.
 A 1c. Tuberosae. A 1g. Pyramidella.
 A 1d. Campanulatae.

A 1a. *Tillaeoideae*.

The flowers are solitary or in simple inflorescences and the petals spreading. The plants are mostly small annuals with insignificant flowers, growing in damp places or in water. They occur in Europe, Asia, Africa, America, Australia and New Zealand.

A. Berger gives 57 species, the following being of greenhouse rank :—

- C. parvula, S. Africa.
 C. lycopodioides, S.W. Africa.
 C. pseudolycopodioides, S.W. Africa.

A 1b. *Stellatae*.

The flowers are usually in a terminal inflorescence; the petals are spreading and free at the base. The plants are more or less fleshy with the leaves distributed up the stems; shrubs or trailing bushes. They occur chiefly in the coastal region of South Africa and up into tropical Africa. A. Berger gives 21 species, those of greenhouse rank being :—

- C. marginalis. C. arborescens.
 C. pellucida. C. argentea (syn.
 C. sarmentosa. portulacea).
 C. lactea. C. cordata.
 C. multicana. C. spatulata.

A 1c. *Tuberosae*.

The flowers are star-like, usually with 5 petals. The plants are succulent shrubs with tubers or rhizomes and grow in moist places. They occur chiefly in S.W. Cape Colony up to Natal. Berger gives 16 species, three of which are asterisked :—

- C. nemorosa. C. septus (syn. capensis).
 C. saxifraga.

A 1d. *Campanulatae*.

The flowers are arranged in an inflorescence, the petals spreading. The plants are succulent shrubs, the stems being fleshy or woody. They occur in S. Africa and Arabia. Berger gives 107 species, of which the following are of greenhouse rank :—

- C. tetragona. C. arta (syn. deltoidea).
 C. perforata. C. falcata.

- C. rupestris. C. perfoliata.
 C. monticola. C. Schweinfurthii.
 C. sarcocaulis. C. alba.
 C. dejecta. C. ramuliflora.
 C. albiflora. C. Peglerae.
 C. scabra. C. reversisetosa.
 C. Cooperi. C. sedifolia.
 C. Barklyana. C. Schmidtii.
 C. rosularis. C. setulosa.
 C. orbicularis. C. turrita.
 C. nodulosa. C. hemispherica.
 C. corymbulosa. C. barbata.
 C. maculata. C. globosa.
 C. deceptrix.

A 1e. *Sphaeritis*.

The flowers are arranged in false umbels or panicles, white, or yellow, the tips of the petals recurved. The plants are small xerophytic shrubs or succulent bushes of various habit. They occur in Cape Colony. Berger gives 25 species of which the following have greenhouse rank :—

- C. clavifolia. C. tomentosa.
 C. ciliata. C. tecta (syn. decipiens).
 C. trachysantha.

A 1f. *Globulea*.

The flowers are arranged in inflorescences, white or yellow, and with the petals joined to the base into a tube. The plants are xerophytic, rather small shrubs with leafy branches or in rosettes. They grow in dry places in Cape Colony from Namaqualand, Basutoland, Orange Free State to the coastal region in the South East and are all very similar. Berger gives 15 species, of which the following are of greenhouse rank :—

- C. cultrata. C. erosula.
 C. obvallata. C. cephalophora.
 C. clavata. C. nudicaulis.

A 1g. *Pyramidella*.

The flowers are bunched in a terminal inflorescence, white, sweet scented, with the petals joined at the base into a tube. The plants are succulent, the leaves in pairs or forming a rosette and close together so that the whole plant is pyramidal or columnar. They grow in Western and Central Cape Colony in places like the Karroo. Berger gives 10 species, of which the following have greenhouse rank :—

- C. columnaris. C. pyramidalis.
 C. Barklyi. C. congesta.
 C. cylindrica. C. mesembrianthemopsis.

Genus A 2. Pagella.

The only species, which is not in cultivation, is a small succulent annual, with an expanded stem like a flat plate and leaves forming a rosette.

Genus A 3. Dinacria.

The three species are small, branched annuals, not in cultivation.

Genus A 4. Rochea.

The flowers are large and scarlet, white or yellow in colour. The plants are shrubs or half-shrubs with opposite leaves, their bases being united. They are found in South Africa. The name is after Dr. de la Roche, a botanical writer. There are five species, all marked with an asterisk :—

- | | |
|------------------|----------------|
| R. coccinea. | R. versicolor. |
| R. falcata. | R. jasminea. |
| R. odoratissima. | |

Genus A 5. Vauanthes.

The flowers are orange or yellow, marked with a V, hence the generic name, and are borne in panicles. The plants are small greyish annuals of peculiar habit. Berger gives one species, which is in cultivation :—
V. dichotoma.

Sub-family B. KALANCHOIDEAE.

This is divided into three genera :—

- B 6. Kalanchoe.
- B 7. Kitchingia.
- B 8. Bryophyllum.

Genus B 6. Kalanchoe.

Lemaire says the name is Barbarian (? perhaps that means not Latin), from one of the species which grows in China.

The flowers are on terminal, often leafy, many-flowered inflorescences, white, yellow or red. The plants have opposite leaves and in many species, the base of the leaf clasps the stem. They are widely distributed in tropical Africa, Madagascar, Southern Arabia, Malaya, Formosa, Java and one species in tropical America.

A. Berger gives 107 species, of which the following are of greenhouse rank :—

- | | |
|------------------|------------------|
| K. aromatica. | K. longiflora. |
| K. Baumii. | K. Gentyi. |
| K. Elizae. | K. crenata. |
| K. grandiflora. | K. luciniata. |
| K. Schimperiana. | K. flammea. |
| K. laciniata. | K. rotundifolia. |
| K. teretifolia. | K. scapigera. |

- | | |
|-----------------|------------------|
| K. kewensis. | K. synsepala. |
| K. marmorata. | K. orgyalis. |
| K. somaliensis. | K. thyrsoiflora. |
| K. tuberosa. | K. Beharensis. |
| K. quartiniana. | |

Soil.—Nicholson says: Sandy loam and brick broken small and well drained pots. Propagation is easy by cuttings.

Genus B 7. Kitchingia.

The flowers are generally large and carried in terminal umbels. The plants are succulent with opposite toothed leaves.

Berger gives 6 species, of which the following are of greenhouse rank :—

- K. peltata.
- K. mandrakensis.
- K. campanulata.

Genus B 8. Bryophyllum.

The name is from the Greek bryo = a plant and phyllum = a leaf, in reference to the plantlets which form in the crenulations of the leaves. These plantlets form upon the leaves on the plant in *B. verticillatum*, *B. tubiflorum* and *B. crenatum*, but in *B. calycinum* they do not form until the leaves have fallen.

The flowers are large, coloured and often hanging, carried in a terminal, three-branched inflorescence. The leaves are opposite or in whorls. The species all come from Madagascar except *B. pinnatum*, which is native in most tropical countries.

Berger gives 26 species, of which only 8 are of greenhouse rank :—

- | | |
|----------------------|------------------|
| B. pinnatum syn. | B. Aliciae. |
| calycinum. | B. proliferum. |
| B. verticellatum. | B. uniflorum. |
| B. Dai-gremontianum. | B. streptanthus. |
| B. tubiflorum. | |

Is This a Record?

An imported specimen of *Cactus amoenus*, purchased in May 1930, failed to root. It remained healthy but shrunken till—on the kill or cure principle—it was put, in January 1933, into a seed frame kept at 70° F, where the atmosphere was always moist. In September there were no signs of roots but by November 3rd, 1933, it was found to have made a good bunch, 3-4 inches long!

V. HIGGINS.

Conophytum doornense, N.E.Br.

Stemless; growths as imported 3-4 lines high, $2\frac{1}{2}$ -3 lines broad and $2\frac{1}{2}$ - $2\frac{3}{4}$ lines thick, subglobose-obconic, convex on the top, without any depression or notch at the fissure, which is $\frac{1}{3}$ - $\frac{3}{4}$ line long and level with the top; surface smooth, glabrous, light apple-green, with the orifice and a dot or sometimes two dots on each side of it rosy, and also a few very indistinct scattered dots of a rather darker tint than the ground colour, scarcely evident except under a lens. Flowers unknown.

Little Namaqualand: near the Doorn River in the Richtersveld, *Herre* 8778.

A very distinct little species, remarkable for its subglobose growths, yellowish apple-green colour and the rosy orifice and a dot or dots on each side of it.

This belongs to the same group as *C. Pageae*, N.E.Br., *C. calculus*, N.E.Br., etc., which are all of a light green or glaucous-green and nearly or quite without markings, and according to my experience do not often flower under cultivation. I have had one species (*C. subrisum*, N.E.Br.) in cultivation for twenty-one years and it has never flowered during that period.

Conophytum decoratum, N.E.Br.

Stemless. Growths small, $1\frac{1}{2}$ -4 lines long, 1-4 lines broad and 1- $3\frac{1}{2}$ lines thick, obconic; in the smaller growths convex at the top without a notch at the orifice; in the larger growths with a slight notch at the orifice and somewhat obcordate at the top, and with a slight ridge over the top transverse to the orifice, which is $\frac{1}{2}$ -1 line long and usually slightly gaping, but sometimes tightly closed; surface glabrous, sometimes dull or dingy green, at others suffused with rosy or dull purplish, with (when exposed to full sunshine) a bright carmine or dull red line along the ridge, which has one or more simple or branched lines extending from it on each side and also often slightly raised, underlying each of these lines is a row of slightly raised dark green dots which remain conspicuous after the red colour has disappeared from want of sun, and often there are also a few other scattered dots; orifice outlined with dark green or red. Flowers not seen.

Van Rhynsdorp Division: Bitterfontein, *Maughan Brown* 1011.

This is an exceedingly pretty little species when exposed to full sunshine in summer, but in winter, in absence of direct sunlight becomes very dingy in appearance. It has not flowered during the three years I have cultivated it.

Conophytum namibense, N.E.Br.

Stemless. Growths small, 2-4 lines high, $1\frac{1}{2}$ - $3\frac{1}{2}$ lines in diameter, obconic, circular or elliptic in outline at the convex top, with the orifice $\frac{1}{4}$ -1 line long, gaping, level with the surface and not puberulous; surface glabrous, green, with the orifice usually surrounded by a nearly circular or broadly elliptic ring of dark green dots, from which, on each side of the orifice, a row of 2 or 3 dots sometimes extends over the top, and with or without a very few other obscure dots scattered on the top, but sometimes there are no markings. Flowers unknown.

Great Namaqualand: In the Namib, *Marloth* 13568.

This species was sent to me four years ago by the late Dr. Marloth, but has never flowered, and does not thrive very well under cultivation. It is a distinct little species, but probably allied to *C. pygmaeum*, Tischer, which I have not seen, but seems distinct by the ring of dots around the fissure, which also seems to have more gaping lips than those of *C. pygmaeum*, according to the description of the latter.

N. E. BROWN.

Treasurer's Note

Subscriptions for 1934 are due on January 1st, 1934, and the Hon. Treasurer would be glad to receive these as promptly as possible. Members will realise that the sending out of individual reminders is an additional expense which could be avoided if everyone sent his subscription in, as a result of this notification. The subscription for Full Membership is 10/-, and for Associate Membership 5/-

The Treasurer's address is:—

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Book Reviews

"BLÜHENDE KAKTEEN UND ANDERE SUK-
KULENTE PFLANZEN," by Dr. Erich
Werdermann, published by J. Neumann,
Neudamm; 6 parts per annum; price
RM 22.80 per an.

Members of the Society who attend the meetings in London will have seen in the Society's Library, a copy of *Blühende Sukkulente* containing four beautiful illustrations in colour of Mesembryanthemums, with descriptions by Dr. Werdermann. This publication is issued in six parts per year, and is now in its third year.

Part 13 contains *Cereus Silvestrii* Speg., which is well known though it is doubtful whether many people regularly flower it as freely as shown in the illustration; *Pilocereus Gounellii* Weber from Brazil, depicted in its native habitat; *Coryphantha pseudoechinus* Bödeker so called to distinguish it from *Coryphantha echinus* Engelman which it much resembles; the brilliant yellow flower of the latter however is very different from the smaller crimson blossoms of the former. The fourth illustration in this part is a very beautiful one of *Echinocactus capricornis* Dietrich.

Part 14 shows *Echinocactus Cumingii* Hopffer, a very rare species which flowers regularly in the Botanical Gardens at Dahlem; it comes from the Andes, but the exact site is not known; Britton and Rose consider it to be a *Lobivia*. *Pilocereus chrysolepis* (Vaupel) Werdermann was originally described from herbarium material, but living plants were introduced in 1932 and the illustration shows one of these plants in flower. *Huernia barbata* (Masson) Haworth has been long known and grows well in cultivation; *Mesembryanthemum (Pleiospilos) simulans* Marloth is shown with the flower rather more orange than is usual.

In Part 15 is included *Rebutia minuscula* K. Schumann, a well-known, free-flowering species which has been variously regarded as an *Echinopsis* and an *Echinocactus*; this illustration is especially beautiful and true to colour. *Melocactus oreas* Miquel is shown in its native habitat, the colour photograph having been taken by Dr. Werdermann in Brazil. *Echinocereus polyacanthus* Engelman has been long in cultivation and flowers freely, as the illustration shows. Another plant which grows well at Dahlem and flowers throughout the summer months is *Cereus Baumannii*, Lemaire.

Part 16 includes *Echinocereus pentelophus* (De Candolle) Rümpler, which has the beautiful flowers characteristic of many *Echinocereus*, *Echinocactus Anisitsii*, K. Schumann, with white flowers, classed by Britton and Rose under *Gymnocalycium*, *Echinocactus horizonthalonius* Lemaire, a beautiful plant which is not always easy to grow and *Opuntia Bradtiana* (Coulter) K. Brandegee; for this species Britton and Rose have made a new genus *Grusonia* since glochids do not occur in the areoles on the joints as in the *Opuntias* though they are found in those of the fruit.

The publishers are to be complimented on a very fine production; the illustrations are beautifully and accurately reproduced. The accompanying text by Dr. Werdermann is very full; besides the complete botanical description of each species, the synonyms are given and references to the most important illustrations as well as historical details and cultural directions.

"EIN MAMMILLARIEN - VERGLEICHS-
SCHLUSSEL," by Fr. Bödeker, published
by J. Neumann, Neudamm, 1933. Price
RM 1.30.

This comparison key of the *Mammillarias* should be of great assistance to those interested in this important group. The key covers those species included in *Coryphantha*, as described by Engelman, 1856, and the group is subdivided more or less in accordance with the classifications of Britton and Rose and of Berger, the genera dealt with being *Neolloydia*, *Coryphantha*, *Neobesseya*, *Escobaria*, *Mammillopsis*, *Cochemia*, *Dolichothele* and *Mammillaria*, and 315 species are here included. Full descriptions of each species are not given, but in each case the salient points which serve to distinguish the plant from its nearest kin are mentioned. The districts in which the plants occur, the authority for the name and the date of discovery are given for each species.

This little work is up-to-date, all the species known up to September, 1932, being included. It should prove a very valuable help to the better understanding of that very large genus *Mammillaria* and the genera most nearly allied to it.

There are nineteen new members to record since the last number of the Journal; as the List of Members will be reprinted early in the New Year, a separate sheet giving the names is not being issued.

RARE SPECIMENS

All beautiful and rare plants which you have seen at my lecture, as well as most beautiful and best growing cacti of Mexico, Bolivia, Peru and Argentina, (Rebutias, Lobivias, etc.), you will find in the assortment of Messrs. W. T. & H. E. Neale, who have a stock of nearly all my specimens.

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MARCH, 1934.

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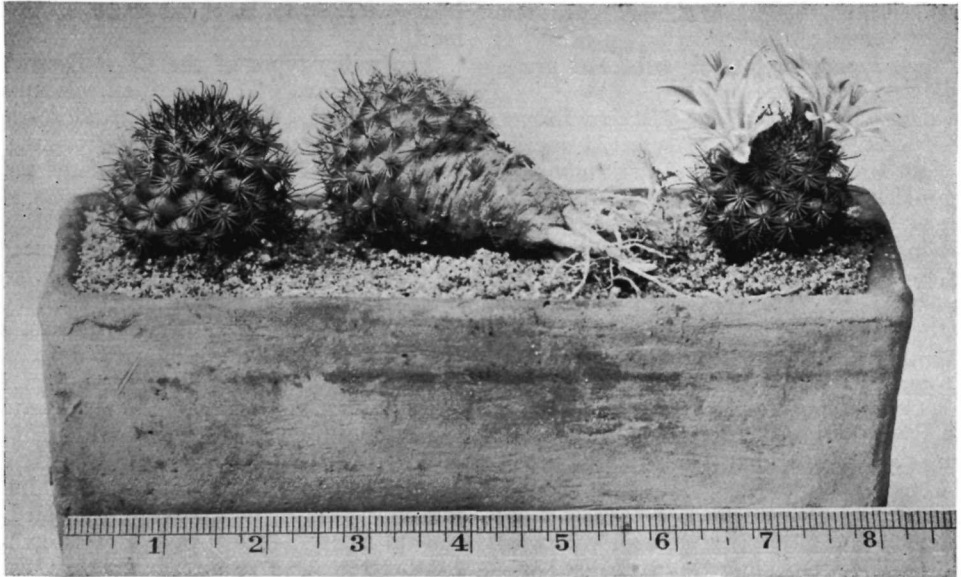
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Mammillaria Blossfeldiana. Type specimen on right.

Mammillarias of Lower California, Mexico

By Howard E. Gates

PLANT hunters in the peninsula of Lower California, Mexico, are amazed at the great abundance and variety of the Mammillarias, which are found everywhere from the sandy plains along the shore to the tops of the barren desert mountains.

Mammillaria dioica is the most plentiful and variable of all. It is found from shore to shore most of the way from the northern boundary to the region of La Paz, a thousand miles to the south-east. In places on the western coast are great colonies of many headed, large plants. On the interior mountains the clusters are smaller and single headed plants more numerous. My travelling companion on the last trip gathered about

twenty-five variations in form and colour before he tired of the task.

Sparsely scattered along the north-western coast is the milky *M. Brandegeei*; usually well hidden as its flat, fine spined top is usually flush with the ground under some bush. Messrs. Britton and Rose grouped *M. Gabbii* with this, but our observations tend to prove that *M. Gabbii* is a distinct species. It is much different in habit, being larger, more globular and covered with coarse brown spines instead of fine grey ones. There is apparently no bridge from its interior desert habitat to the moist coastal range of *M. Brandegeei*.

On a gravelly beach overlooking the

northern reaches of the great Vizcaino Bay on the peninsula's west coast I surprised my companion by stooping over and beginning a search among the small stones at my feet. At last I drove my pick beside what appeared to be a brown pebble and up came a carrot-rooted specimen of *M. Blossfeldiana*. Then we found that we had literally been stepping on a myriad of them, for they are hardly distinguishable from the small stones. This newly described species is very peculiar in that, though it is fleshy rooted, it is not milky and is hooked spined. The bright pink flowers are very large for this genus. The mortality among the collected plants has been very high, but our experimental grafts are doing splendidly.

On the sandy plains of the Vizcaino Desert, west of Calmalli, is a little clustered species with light coloured spines and darker hooked centrals that may prove to be a new species. These five species appear to be all that are found in the seven-eighths of the peninsula lying to the north of La Paz. It is the remaining portion to the south of La Paz that the Mammillarias reach their greatest variety.

M. armillata is the predominating species of the Cape Region as this southern district is called. *M. armillata* is almost as variable in shape and size and colour as *M. dioica* is to the north. The size varies from small clusters to giants with heads a foot or more in height. The prevailing general colour of the plant body is blue-green with grey and brown spines. Sometimes it is characterised by the dark horizontal bands that give it the name of "*armillata*."

Last spring we found a small clustered, light-spined species in the environs of La Paz, which will very likely be named in honour of Howard O. Bullard, a Vice-President of the Cactus and Succulent Society of America. This one loves a silty, sandy plain while nearby on a point of rocky hills running into the Gulf of California is the slightly larger and freely clustered *M. Fraileana*. The spines and body of this plant always have a pinkish cast and the pretty pink, wide-open flowers are marked with deep carmine pink midribs.

At the base of a high range of mountains near Todos Santos are clustered heads of *M. phitauiana* bearing weak white and grey spines. Over the mountains near San Bartolo is another unidentified species of similar habit whose general colour is almost white and the hooked central spines are so small that they must be looked for to be noticed.

On the eastern or gulf side of the peninsula near the Bay of Los Muertos, it was my privilege to discover *M. capensis*, growing under the small trees of a sandy valley. There are few plants that cluster as freely as this brown-spined beauty. Its central spines are real fish hooks and the flowers are a real pink. In a similar terrain on the Pacific slope north of Todos Santos is the counterpart of *M. capensis* except that the flowers are nearly white. The fruits of all these clustered types are club-shaped, scarlet and tasty though a little tart. My pair of Mexican chipmunks think there is no finer food.

The milky types of the Cape District are a real puzzle. They are all globular to hemispherical, fleshy-rooted, white-woolly in the axils, straight-spined, yellow-flowered, reddish-fruited and brown-seeded, making it very hard to draw the line between true species and variations caused by locality and terrain. Clusters are not plentiful except in *M. petrophila*, *peninsularis* and my No. 505.

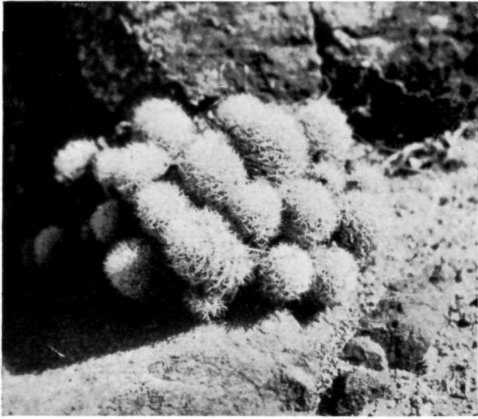
M. arida grows on the same rocky point as *M. Fraileana* and its modern descendants do not quite fit the recognised description. Its grey and brown spined globular heads are usually found singly, though from under a rock I dug out a sprawling patriarch with seventeen heads. *M. peninsularis* is the most distinctive of all, though far from a beauty, as it only grows on wind swept Cape San Lucas and its nearly naked nipples are often badly weathered. The spine clusters are usually composed of about four short grey spines with no central.

A long mule trip over miserable trails is necessary to reach the home of *M. petrophila*. This district is exactly under the Tropic of Cancer, with an abundance of tender tropical growth in the low lands, yet where *M. petrophila* grows the elevation is so great this is replaced by an abundance of oaks and pines. The clusters of *M. petrophila* resemble great pans of round rolls.

In addition to these there are at least five undescribed milky species. The most interesting of these is my No. 128 from the coast hills on the tip of the peninsula. It is usually single headed with very long central spines that are nearly black. No. 505 is freely clustered, large-headed, brown-spined species from sandy bottom lands near Todos Santos. No. 508 from San Bartolo and No. 510 from Vinramos are two white-spined varieties that grow in the cracks of granite cliffs. The other known species of Lower California, *M. Evermannia*, *cerralboa*,

albicans, *Slevinii*, *Palmeri* and *Goodridgei*, grow on islands that it has not been my good fortune to visit.

Bartschella Schumannii grows along the southernmost coast in clusters of low blue-green heads bearing white to brown spine clusters with one hooked central spine. The beautiful large pink flowers are followed by a clavate scarlet fruit similar to that of the *Mammillarias*, save that it is hollow so that when it ripens and falls off the loose seed drop out of the base of the fruit. My observations are contradictory to the published descriptions which say the flowers are purple or lavender and the fruit short and dull in colour.



Bartschella Schumannii.

Aside from the *Bartschella* there are no *Coryphanthas* or plants closely related to the *Mammillarias* except the four *Cochemieas* which really form a story in themselves.

Rhipsalis at Kew

DURING the first months of the year visitors to the Succulent House at Kew should not miss the exhibit of numerous species of *Rhipsalis* which are generally to be found about halfway along the staging at the western side of the house. At the end of January a number of these are in flower, others are bearing fruit while many are yet in bud. Most authorities agree in placing the genus *Rhipsalis* as the most highly developed of the numerous genera comprising the family *Cactaceae* and in general appearance the plants differ very considerably from the better known genera,

excepting the *Epiphyllums*, to which they are nearly related.

The *Rhipsalis* are almost all found in their native habitat growing on trees in the forests of South America, chiefly in Brazil. Two species however occur in Mexico, others are found in Florida and the West Indies. A few species have been recorded in Africa and Ceylon. Whether these plants are natives of these localities or have been introduced by birds or man is still uncertain. The point is of considerable interest as, if native, these species form the one exception to the general rule that all genera of cacti are peculiar to the American Continent. Definite confirmation of this would open up a very wide field for speculation on the evolution and development of the *Cactaceae*.

In the Kew Hand-List of Tender Plants some twenty-six species of *Rhipsalis* are listed and most of these can be seen in the Succulent House. All the *Rhipsalis* are much branched and the joints are cylindrical, angular or flat. Leaves are non-existent or merely represented by scales. The flowers, which are small, white, cream or rose-coloured, arise from numerous areoles along the branches; in the case of the flat-jointed varieties these areoles are situated on the edges of the branches and when in flower give the impression of "plants with tiny flowers growing on the edges of the leaves." Of the plants shown at Kew, *R. rhombea*, *R. Houlettiana* and *R. Warmingiana* are good examples of those with flat joints. The last two have red and dark purple fruits respectively. *R. cassytha*, *R. clavata*, *R. prismatica* and *R. teres* have very thin cylindrical branches. *R. trigona*, *R. grandiflora*, *R. puniceo-discus*, *R. pentaptera* and *R. dissimilis* are examples of those having thicker cylindrical branches while in *R. squamulosa* and *R. paradoxa* the branches are triangular in section. *R. pentaptera* has white fruits which bear a close resemblance to mistletoe berries and in fact the whole plant is not dissimilar in general appearance to the mistletoe and is, in consequence, sometimes called the Mistletoe Cactus.

Members may like to know that with the June number it is proposed to issue a title-page and index to the two volumes of the Journal, which will then be completed. The Publishers have also arranged to undertake to bind the eight issues in one volume. Further particulars will be given in the next number.

Euphorbias

By Dr. H. T. Marrable, M.A.

(Read at the Meeting on December 12th, 1933).

I AM painfully conscious of the saying—“Fools rush in where angels fear to tread.” The possibility that there are angels present is a disturbing thought; I only hope they will be given the grace to suffer the fool gladly! However, there is an old Persian proverb which says: “He that knows not, and knows not that he knows not, will remain forever in darkness, but he that knows not and knows that he knows not will arrive at journey’s end by sunset.” In that latter category I find myself, but I hope that when I have finished you will help me a stage further on the journey.

While all Cacti are succulents, some more and some less, this is by no means the case with Euphorbias. The family Euphorbiaceae is a very large one, and is found all over the globe. Anyone indeed who possesses a garden large enough to swing a cat in, grows Euphorbias willy-nilly. There is hardly a more ubiquitous weed than the spurge *E. peplus* and there are twelve different varieties of that weed. Another herbaceous plant which grows readily in many gardens is *E. myrsinites*.

The Euphorbia provides us with the most drastic purge we possess, Croton oil, while the Castor oil plant, *Ricinus communis*, comes from the same family. What is usually wrongly sold as the Castor oil plant, *Aralia Sieboldii*, does not. The tropical shrubby plant, Poinsettia, with its beautiful red bracts is *Euphorbia pulcherrima*.

The name Euphorbia has an interesting history behind it. The original name for the individual plants of the family Euphorbiaceae was not, as it is now, EUPHORBIA but EUPROBIUM, under which name it is found catalogued in the *Gardener’s Dictionary* by Phillip Miller in 1733 in London. The name, however spelt, is from the Greek *εὐφορβία* and means “well fed.” At first one would be inclined to think that the plants would be named after the place EUPHORBIA in Phrygia, which like EUCARPIA obtained its name from the fertility of the soil. This however is not the case. The name was given to the plant in honour of EUPHORBUS, Physician to Juba II, King of Mauretania, who cured Augustus Caesar of a disease from which he suffered with *E. verum*,

which is synonymous with *E. antiquorum*. The plant *E. regis-jubae* is named after the king.

I have ransacked every catalogue and book that I could lay my hands on, in order to arrive at the approximate number of known species of succulent Euphorbias. A number of names have had to be eliminated, as several plants have duplicated names. The succulent species I estimate to number 170.

The great difficulty the collector is up against is the perfectly hopeless state of the nomenclature. A dealer sells you a plant, with some name attached; in most cases he has received it from a South African dealer. I have dealt direct with several South African firms but I cannot say I have much faith in their naming. A few months ago I sent for a list of Euphorbia plants from a dealer in the Midlands; among them was one listed as *E. columbrina*; this was new to me, and as I can no more resist a new Euphorbia than I can my after-breakfast pipe, I sent for it. It was *E. mammillaris* v. *spinosior*. I acquired an unwanted *sub-mammillaris* under the title of *mexicana*. At one time I possessed six plants of *E. resinifera*, four of these being sold to me as *E. mogador*. I think the reason for that is that the drug Euphorbium, which is extracted from *E. resinifera* is exported from Mogador.

According to Jacobsen and from plants in my collection *E. aggregata* and *E. enneagona* appear to be the same. Again according to the same authority, *E. heptagona* and *E. enoplea* are identical, but I am not sure about that. There are two distinct varieties of *heptagona*—*E. heptagona* and *E. heptagona* v. *rubra*.

Apart from the fact that two names are in circulation for a single plant, the pundits who have given us the nomenclature appear to be arithmetically obsessed. Listen to this list:—polygona = many-angled, enneagona = nine-angled, heptagona = seven-angled, pentagona = five-angled, tetragona = four-angled, trigona = three-angled. This is Greek. And then to show they knew some Latin they presented us with quinquecostata = five-ribbed, quadricostata = four-ribbed and triangularis = three-angled. Now, if there is one plant that seems constitutionally unable

to make up its mind how many angles it is going to start life with, and how many it is going to end up with, it is the succulent Euphorbia. Many start life with three angles, then the main stem develops four, while branches are a law unto themselves, sometimes four, sometimes five, and sometimes six. Then again, I think it shows rather a paucity of imagination to name Euphorbia plants *E. cactus* and *E. pseudocactus*.

I suppose the finest collection of Euphorbias in the world is Sir Thomas Hanbury's at Ventimiglia. His curator, the late Alwin Berger, has written a book on the subject, but the last edition of it appeared in 1907. By far the best collection I have seen is in the Botanical Gardens at Glasnevin, County Dublin, and I spent many hours going through it last August. There is a magnificent specimen of *E. arborea* over 20 feet high.

A word about the cultivation of these interesting plants. Generally speaking they require much the same treatment as cacti, but whereas cacti thrive under conditions that would be fatal to many plants, and resent being fed from the rich man's table, I have found that Euphorbias appreciate more liberal diet. They are not for the most part inhabitants of the arid desert. They grow in the Canary Islands, Northern Africa, tropical Africa, South Africa, Madagascar, India, the East and the West Indies to mention some of the places, and in many of the localities the soil is rich. An open compost, with good drainage is essential. Loam, coarse sand and a liberal portion of peat seems to suit them. Frick recommends weak liquid manure at the beginning of the growing season. I have certainly found that the plants respond to good feeding, and they do not suddenly plump up and become a horrid pulpy mass—a nasty habit of the Cacti. They should not be kept as dry as Mammillarias, for example, in the winter, and a temperature of 50° F. is low enough.

As far as I know all Euphorbias, whether herbaceous, shrubby or succulent, are characterised by the white milky juice; it is very caustic and its poisonous properties vary considerably. The natives of Bechuanaland used to dip their arrow heads in the juice of *E. caput-medusae*; on the other hand *E. esculenta* is eaten by the natives.

Some of the South African Euphorbias are getting rare; some have never been common. *E. tuberculata* is one of the rarest; a mature specimen of *E. horrida* is hard to obtain. *E. obesa* has had an embargo placed on its export by the South African Govern-

ment, but seedlings from nurseries can be obtained, Euphorbia seeds grow quite readily. An *E. bupleurifolia* seedling of mine flowered in September, having been sown in the previous February.

The flowers are always unisexual, the fruit consists of three carpels, each with a single seed. If you want to get some of the plants true to type you must either grow them from seed obtained from the source or else buy exported plants. Plants grown from cuttings—and they root fairly readily—do not always develop the characteristic of the parent plants. This refers more particularly to those of the *medusae*-type, and to some other types as well. In this they differ markedly from the Cacti.

[Thirty-six photographs of plants in his collection were shown by Dr. Marrable; the numbers following the names show which plants were illustrated.]

I have been trying to elucidate whether *E. virosa* (1) and *E. coerulescens* are distinct species or whether the latter is a variety of the former. Berger makes *E. coerulescens* a variety of *E. virosa*, but my attention has been called to the paper by Prof. Marloth in the S.A. Journal of Science, November 1930, in which he makes a separate species of it. The most noticeable difference is that *E. virosa* has a main arterial stem, whilst *E. coerulescens* branches at the soil level. There is a difference in the inflorescence also. Berger places this plant in the Polygona-group, and places in it also such widely different plants as *E. echinus* (2), *E. beaumeriana*, *E. resinifera* (3) wrongly called Mogador, *E. ledienii* (4), *E. triangularis*, *E. canariensis* (5)—this plant I see myself having to behead, it is growing about six inches a year. Marloth groups with *E. virosa*, *E. hottentota*, *avas-montana*, *Cooperi*, *venenata*, *coerulescens*, *sagittaria*, and *kalaharica*.

The type of the Medusae-group is *E. caput-medusae*; I had not the heart to photograph my specimen after a visit to the South African exhibition a few weeks ago. In the same group is *E. caput-gorgonis* and *pugniformis*, and I think in it should be included *E. crassipes* (6); Berger also puts in it *E. viperina* (7) and *E. multiceps* (8). *E. serpentina* (9) is probably a hybrid, possibly a cross between *E. caput-medusae* and *E. viperina*. In the Pseudo-medusae group is included *E. procumbens* (10).

A group of spineless, long-stemmed plants rather like asparagus stalks contains *E. funalis* (11); I can see no difference between this and *E. mauritanica*. Then there

is *E. Dregei* or *Dregeana*, with a much thicker stem. *E. pendula* (12) is not in the same group as the previous ones but looks somewhat like it.

Then we come to the Crown of Thorns, *E. splendens* (13); this plant is more shrubby than succulent, consequently it needs more water and should never be let get dry. It losses its leaves in winter if kept cool, but in a warmer house retains its leaves and flowers most months of the year. It comes from Madagascar as does the variety *parvifolia*, and also *E. Bojeri*, in which the leaves are broader and flattened at the top.

E. Lemairei (14) is an interesting plant. Frick says in the American Journal that it is a cross between *E. grandicornis* and *E. pseudocactus*; that further it is a chimera, that is it grows at one time of the growing season like one of its parents and later like the other. It is certainly easy to see that parts of the plant resemble *grandicornis* and parts *pseudocactus*. He also says that if richly fed the *grandicornis* feature predominates, and if starved, the *pseudocactus*. This article was followed the next month by one from Dr. Leon Crozat who said in effect that this was all nonsense, that the plant was a true species and grows freely round Zanzibar.

I had a dark green plant of *E. meloformis* v. *Corderoy* (15) which may have been *E. meloformis* pure and simple; unfortunately it died. I have lost only two plants in five years, one was this *meloformis* and the other an *obesa*. They both represent the extreme of succulence and should, I suggest, be kept quite dry all winter.

I have two plants labelled *E. valida* (16), the one shown and another rather more conical in shape. I hope for enlightenment as to whether it is a different species or a variety or whether there is any difference at all. *E. obesa* (17) comes into the same group, called by Berger Meleuphorbia.

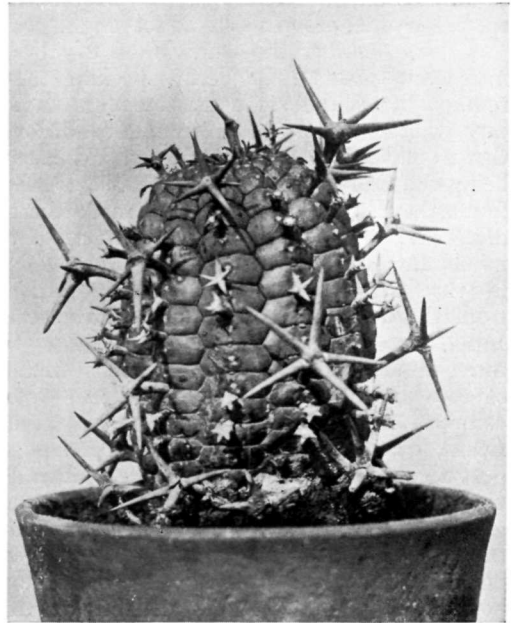
These two photographs, both of *E. stellaespina* (18 and 19) showed marked differences. The younger plant has much better developed spines, the older has a well-marked corona of leaflets. The difference might be due to sex, or possibly one is a nursery-bred plant and the other a desert-bred one. Berger places this plant in the same category as *E. cereiformis* (20), *E. aggregata*, *E. pentagona* (21) = *E. Royleana*, *E. erosa* (22), *E. heptagona* (23), *E. heptagona* v. *rubra* (24), *E. mammillaris* (25)—of which there are two, possibly three varieties, *mammillaris*, *mammillaris* v. *spiniosior* and *sub-mammillaris*.

E. Hermentiana (26) and *E. lactea* (27)

may be grouped together. Then there is *E. grandidens* (28).

Amongst the *Grandifolia* is to be found *E. nerifolia* (29); there is a crested variety of this; the plant comes from Bombay and the Deccan and is common in Jamaica.

E. clandestina (30 and 31) is a handsome plant growing four feet high and in the same class we get *E. bupleurifolia* and *E. clava*. The two plants of *E. globosa major* (32) shown in this photograph are distinct; one is much more globose than the other. Possibly *E. pseudo-globosa* is a correct name for the less globose one. *E. glomerata*, a horticultural name, should I think be dropped. Closely associated is *E. ornithopus* and less closely *E. anacantha* = *E. tridentata*.



Euphorbia stellaespina.

Of plants not mentioned by Berger there are *E. ferox* (33) of which, according to Mrs. van der Bijl's price list there are two varieties; *E. elliptica* (34), an insignificant little plant; *E. Suzanna* (35), a pretty little plant with very pointed tubercles but without spines and *E. squarrosa* (36), also called *stellata*. I had to unearth this plant to photograph it as its root is much the most imposing part; it reminds one of all sorts of things, including the hunchback of Notre Dame.

I am indebted to my friend Captain Dunston, a member of this Society, for help in preparing this paper.

Sir William Lawrence, Bt., V.M.H.

THE world of horticulture is the poorer to-day for the loss of Sir William Lawrence, who died suddenly on January 4th, 1934, when on his way to a Committee Meeting at St. Bartholomew's Hospital, of which he was Senior Almoner.

Sir William was in his 64th year; he was educated at Shrewsbury, New College, Oxford, Heidelberg and Berlin and later became Lecturer in Organic Chemistry at Manchester University. In 1913 he succeeded to the baronetcy and in 1916 moved to Burford, under the shadow of Boxhill, there to carry on the care of the beautiful gardens laid out by his father, Sir Trevor Lawrence, who was for twenty-five years President of the Royal Horticultural Society and whose name is a household word amongst orchid growers. Sir William was not himself greatly interested in orchids and the famous collection was dispersed after Sir Trevor's death; but there were constant additions to the gardens of interesting hardy and half-hardy plants and shrubs, with which Sir William delighted to experiment. He had, also, an unusual knowledge of fruit and vegetables, growing many of the choicer and rarer sorts, and was as familiar with their culinary as with their horticultural aspect.

Sir William served for many years on the Council and Committees of the Royal Horticultural Society; from 1924 to 1927 he held the post of Treasurer and during this period the New Hall in Greycoat Street was built. He was a familiar figure at the fortnightly meetings and his "infectious enthusiasm" in the cause of horticulture must have fired the imagination of many novices. He realised the advantages of corporate action in any venture and was always willing to give practical advice and assistance to any band of enthusiasts wishing to unite for a common purpose. It has been said of him that "he loved founding societies."

It was thus that the connection between Sir William and the Cactus and Succulent Society began. Our first Secretary, having sounded the possibilities of forming such a Society, was then put in touch with Sir William who, as members will remember, consented at the inaugural meeting, to accept the post of President, which post he had held for two years. He did not himself grow succulents, except the more or less hardy *Sempervivums*, and was on the whole more interested in the success of the Society as a means of linking up enthusiasts, than

in the plants we grow. As members will have realised, Sir William was not the sort of man to be content to lend the prestige of his name; he took an active part in the



direction of the Society's affairs and was always ready to go into details and to give us the benefit of his long experience in horticultural matters, so that in a short two years the Cactus Society can claim to have become an active body with a definite policy, recognised by horticultural authorities—and this, in very large measure, we owe to our first President. Sir William wrote, in a charming and individual manner, in the gardening press and here again we are indebted to him for the frequent references to the Society he found opportunity to make.

Members who had not met him will have been conscious of the guiding hand behind the Society's schemes; those who knew him will not soon forget his kindly personality, and your Secretary will greatly miss, on your behalf as well as on her own, the usual friendly greeting, "Well, can I do anything for you?" The Society is very conscious of the loss it has sustained by Sir William's sudden passing.

V. H.

Soils

(Report of Discussion on November 7th, 1933)

DURING the autumn of 1932 members had an opportunity of discussing the various potting composts recommended for cacti and other succulents. It was felt that experiments might with advantage be carried out and on November 7th, 1933, a further discussion took place, to which many members contributed the results of their own experience.

Three members who were unable to attend the meeting had kindly sent in suggestions. Mr. F. E. Cooper, of Shanklin, writes: "Having tried practically everything except burnt clay for growing cacti, I have come to the conclusion that as long as you have plenty of coarse white sand, the other ingredients are not so particular. Mixed with broken brick, ordinary garden soil or leaf mould the results are good in each case and amongst other advantages expense is practically nothing. I use a little charcoal but the chief ingredient is coarse white sand and for general purposes I have discovered or tried nothing more successful than coarse white sand and garden soil." It may be mentioned that the sand Mr. Cooper uses is taken straight from the sea shore, unwashed and therefore contains salt. Mr. A. E. Watts, of Fenny Bentley Hall, recommends the following mixture:—

- 5 parts of good, *sweet*, fibrous yellow loam.
- 2 parts of crushed bricks, fine to $\frac{1}{2}$ in., free from dust.
- 1 part of old *sweet* oak leaf mould.
- 1 part of crushed old mortar, free from dust.
- 1 part of coarse sand.

Mr. J. W. Moore, of King's Norton, suggests the use of a chemical fertiliser; equal quantities of nitrate of ammonia and phosphate of potash, $\frac{1}{2}$ oz. of the mixture to one gallon of water; if the solution shows an acid reaction, add lime until neutral. He finds this especially good for *Opuntias* and *Stapelias*.

Mrs. Higgins then reported on an experiment that she had carried out; on January 1st, 1933, two seed pans were planted; in each were three two-year-old seedlings of *Echinocactus (Echinofossulocactus) albatius*, chosen from about 80 plants to be as nearly alike as possible, and five offsets (unrooted) of *Mammillaria fragilis* from three different plants, also as nearly the same size as possible. The two seed pans were crocked equally with very coarse burnt clay; one was then

filled with rather finer burnt clay and the other with a mixture composed of one part heavy loam in nodules with the dust sieved out, one part burnt clay, one part old mortar rubble and coarse sand. Both pans were top-dressed with very fine burnt clay so that the evaporating surface might be as similar as possible. They were kept on a shelf near the glass and were watered from below whenever the surface appeared dry. It was thought that this would be a fairer method than giving equal amounts at equal periods as the relative power of retention of the soil would be different in the two cases. The pan containing burnt clay needed water thirty-two times as against twenty-six times for that filled with the mixture. In November, when the two pans were shown at the meeting, there was a very considerable difference between them; the plants in burnt clay had not made anything like so much growth; the average diameter of the *Echinocacti* (one of which had rotted off in February) was about $\frac{3}{4}$ in., with very weak spines, and of the *Mammillarias* about $\frac{1}{2}$ in.; none of the latter were making offsets. The plants grown in the mixture, on the other hand, besides being healthier and greener had grown considerably; the *Echinocacti* averaged well over an inch in diameter and had very strong, coloured spines, while the *Mammillarias* were quite an inch in diameter and bore four to seven offsets each. There could be no doubt from the comparison of the pans that the plants in pure burnt clay had been starved.

Mr. Boarder brought up seedlings of *Mammillaria centricirra*, one of which had been transplanted into burnt clay and the other into a loamy mixture; the one in burnt clay was barely a quarter the size of the other; this was, however, rather a drastic test as it is not generally recommended to use burnt clay for seedlings only a few months old. Mr. Boarder considered that burnt clay might be very useful to anyone who wished to limit the size of his collection, as plants could be potted into it on reaching a certain size, after which growth would be retarded.

Mr. O'Donoghue said that he could not entirely agree with Mr. Boarder, who, he thought, was judging from too narrow an area; Mr. Boarder chiefly grows *Mammillarias*, many of which are used to fairly rich meadow soil; but for types normally inhabiting a poorer soil he thought that anyone

potting these in the rich compost recommended by Mr. Boarder and watering too freely might shortly expect a large number of funerals. Mr. O'Donoghue had also experimented with burnt clay; he had some South African plants which had been kept dry all the summer; two plants he was able to split in half and plant one piece in burnt clay and the other in a loamy mixture; there was not much difference between the two pieces in each case and both were showing for flower. At the time of the meeting there was a difference between the two halves, those in the loam being, in each case, a little larger; but they had been referred to an expert familiar with the plants in their native habitat who thought the plants in burnt clay were rather nearer the true type. In recommending burnt clay for amateurs who were inclined to over-water, Mr. O'Donoghue said he thought it was probable that the material should be stacked for a year or so to mellow before use.

Mr. Collings said that, in his experience, plants did not grow so quickly in burnt clay but for a big plant that one valued he would certainly recommend its use for safety.

Miss Durham thought a distinction should be made between the treatment of adult plants and seedlings, on the principle that grown-ups wanted different food from children.

Mr. Denton had tried choice Euphorbias in burnt clay and found it a complete failure, and he had no use for it, especially for seedlings.

The question was raised as to whether all the burnt clay available had the same physical and chemical properties and it was evident that some varieties were softer than others and tended to break down too readily. Nothing was known of the differences in chemical composition though the method of burning—with wood, coal or both—probably caused variations, even supposing the clay to have been of the same composition originally.

Mr. Seaward said that he had used burnt clay for cacti thirty years ago and found it excellent for rooting plants but that they would not live in it for more than twelve months. It was suggested that plants in burnt clay were more liable to be attacked by root bug; several members agreed that they had found this to be the case.

Mr. Higgins suggested that experiments with various salts as fertilisers might give useful results; the natural soils in which

many cacti grow have, owing to the small rainfall and consequent lack of leaching, a very high mineral content. Burnt clay does contain many of these salts; if it is mellowed it is possible that it picks up carbon dioxide so that soluble salts would be formed which would then be available to the plant. Organic fertilisers are not to be recommended owing to the danger of introducing harmful bacteria, but chemical fertilisers might be useful in some cases, for all cacti do not require the same treatment.

Mr. Shurly said that he had definitely abandoned the use of burnt clay, as he found it tended to break down and stop the drainage; he also thought that the baking was equivalent to sterilising the soil, which he did not consider advisable.

As was only to be expected, the discussion led to no definite conclusions, though, on the whole, burnt clay seemed to be rather less favoured than formerly. The Chairman, Mr. Farden, brought the meeting to a close by saying that, personally he was sitting on the fence, using either a loamy mixture or pure burnt clay and changing from one to the other.

Echinofossulocactus, Br. and R.

BERGER (1929) says: "Britton and Rose have dug out for this group the unwieldy name *Echinofossulocactus*, Lawrence (1841). But under this name Lawrence conceived various *Echinocactus* and by no means only those attached to this group. Spegazzini has put forward the name *Brittonrosea* (1923), but there is no ground for this substitution for the present and very appropriate name *Stenocactus* of Schumann (1898).

The name *Stenocactus* K. Sch. is used by Berger in his "Kakteen" of 1929 to include all those *Echinocactus* characterised by having a large number of ribs running close together, e.g., *coptonogonus*, *tetraxiphus*, *Lloydii*, *hastatus*, *multicostatus*, *pentacanthus*, *Boederianus*, *Wippermannii*, *heteracanthus*, *lamellosus*, *arrigens*, *crispatus*, *obvallatus*, *anfractuosis*, *phyllacanthus*, *violaciflorus*, *grandicornis*, *tricuspidatus*, *oligacanthus*, *gladiatus*, *dichroacanthus*, *lancifer*, *Whipplei*, *polyancistrus*, *Sileri*.

HY. J. TURNER.

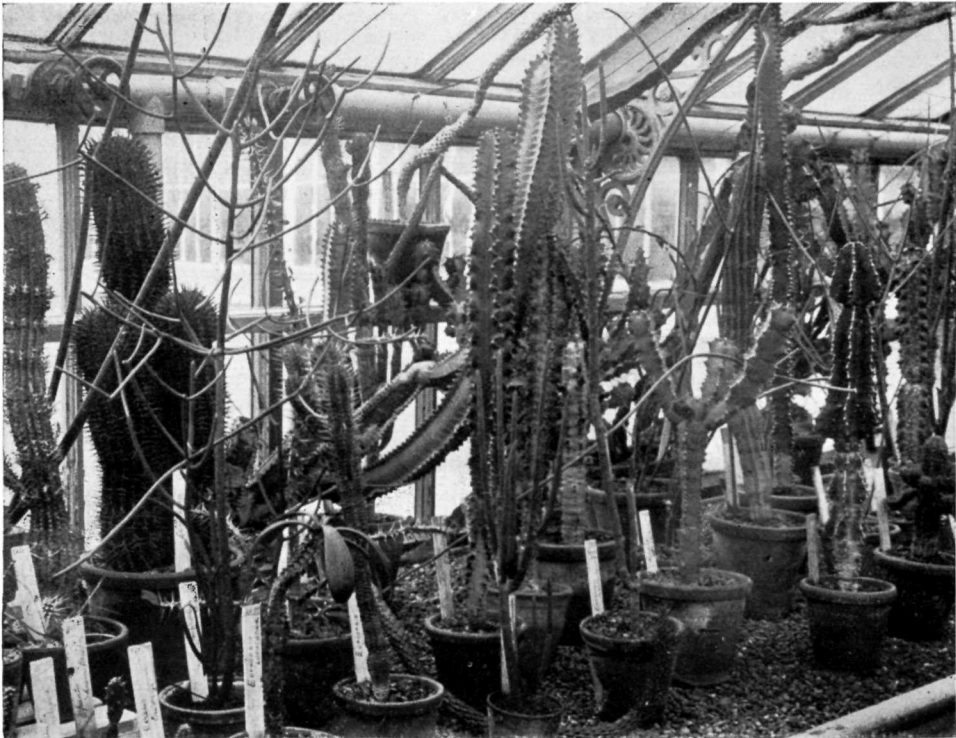
The portrait of Sir William Lawrence, on Page 47, is reproduced from *Gardening Illustrated*, by kind permission of the Editor.

Succulents in the Royal Botanic Garden, Edinburgh

THE collection of succulents at the Royal Botanic Garden, Edinburgh, was probably started before the Garden moved to its present site, and records of plants coming into the collection can be traced back to the nineties during which time the present Cactus House was built. Since those years, thanks to the many private correspondents and Botanical Institutions, the collection has increased to many hundreds

being grouped together as far as possible. Up to the present Britton and Rose's Classification has not been adopted.

On the staging are arranged the various species of *Cereus* including such as *C. amecaensis*, *Cavendishii*, *Celsianus*, *enneacanthus*, *gemmatus*, *lamprochlorus* and *marginatus* among the heavier growers, while among the more slender types are *Macdonaldina*, *rostratus*, *Smithii* and *speciosissimus*. Mention might



Euphorbias in the Cactus House, Edinburgh.

of species, so much so that owing to the lack of accommodation many of the species have been cut down to only one plant. Owing to the same lack of room the collection is somewhat scattered and various genera may be found in other houses, pits and frames when they would be more at home in a house set aside for succulents only.

The Cactus House, wherein those succulents requiring temperate heat are housed, has a bed along the centre portion, and round the wall of the house there is a staging for pot plants. It is on this staging that most of the interesting species are to be found, the genera

be made also of the large-flowered *variabilis*, *validus*, *chalybaeus*, **parviflorus*, *pomanensis*, *Napoleonis* and *senilis*.

Only a few of the species of *Rhipsalis* are here—*paradoxa*, *Regnellii*, *Suarezana*, *Tonduzii*, *dissimilis* var. *setulosa* and the more commonly known *mesembryanthemoides*.

The *Echinocactus* are represented by the attractive *Grusonii*, and the neat *minusculus*, while other species include *horizonthalonius*, *Visnaga*, and *ottonis* var. *paraguayensis*.

Three interesting plants to be found on this portion of the staging are *Echidnopsis Dammanniana*, *Astrophytum myriostigma* and

Pelecyphora aselliformis, the former from Abyssinia and the two others from Mexico.

The *Euphorbias* are well represented here by *obesa*, *meloformis*, *aggregata*, *ornithopus*, *Erythraea*, *Ledienii*, *ingens* and *platyphyllos*, while among the more slender types are *Intisy* and *viminalis*. Trained up the roof is a plant of *E. mauritanica*. On a smaller staging there are *Huernias*, *Stapelias* and *Carallumas* such as *lutea*, **Vansonii*, **Tapscottii* and **atrosanguinea*, together with *Kleinia anteuphorbium*, *Ariocarpus furfuraceus* and *fissuratus*. In a group of *Opuntias* there are such species as *imbricata*, **Pittieri*, the

flower well in this house, there being about sixty different species and varieties.

Crassulas and *Cotyledons* including *Cotyledon Wallichii* and *Hovenii*, and the many tender *Sempervivums* are grouped together here. *Echeverias* including **oviforme*, **uniflora*, **laurifolia* and **gerbella* are also interesting plants and have only recently been added to the collection.

Among the many *Haworthias* mention might be made of *arachnoidea*, *coartata*, *cymbiformis*, *translucens* and *fasciata*. Most of the *Ceropegias* are scattered in other houses. Among those that are in this house are



Cactus House, Edinburgh.

yellow-spined *Scheeri* and the almost spineless *tomentosa*. Among the *Mammillarias* are *plumosa*, the common *elegans*, *elongata* var. *stella-aurata*, *compressa* and, one which attracts quite a lot of attention, *gracilis* var. *Krameri*. Numerous *Agaves*, *Aloes* and *Yuccas* are also on this staging and include *Aloe minima*, *dichotoma* and *Marlothii*.

Senecios are more or less scattered over the house, one or two in the bed and several on the staging, and they include such as *scaposus* var. *caulescens*, *articulatus*, *stapeliaeformis*, *juncus*, **conchocladus*, *Haworthii* and *repens*. *Mesembryanthemums*

dichotoma and *fusca*; not unlike these are *Sarcostemma Brunonianum* and *viminale*. There are many odd species of various genera such as *Gormania Watsonii*, *Monathes pallens*, **Stylophyllum edule*, *Aeonium caespitosa*, *Rochea falcata*, *Synadenium Grantii*, *Brynesia Weinbergii* and *Portulacaria afra* which are of considerable interest. Climbing up the roof of the house are a species of *Pereskia*, *Vitis bracteolata*, *Senecio hadiensis* and *macroglossus* and at the end of the house *Euphorbia splendens*.

In the bed are planted rather a mixed collection. There are large plants of *Cereus*

jamacaru and its *var. glauca*, *C. *sublanata*, *C. Blanckii*, *Euphorbia characias*, *E. officinarum*, *E. alpicornis*, *E. *Regia Jubae* and *E. grandidens*; there is also a large plant of *Opuntia leucotricha*. Among the Monocotyledons in a bed are *Aloe arborescens* seen in flower in the photograph, *Yucca *elephantipes*, *Y. baccata*, *Dracaena Draco*, *Zanthorrhoea arborea*, *Dasyllirion serratifolia*, which is also seen in the photograph, and *Nolina recurvata*. The interesting *Testudinarias* are also in this bed.

In one of the warmer pits are housed several species of *Ceropegias* such as the beautiful *Monteiroae*, also *Thorncroftii*, *Meyeri*, *Haygarthii*, *caffrorum*, *dichotoma* and many others. A very interesting epiphyte is **Dischidia Vidallii*, the specific name is the one that was received with the plant, but no trace can be found of it. The remainder of the collection is scattered over frames and houses excepting the young plants and seedlings which are housed in the succulent pit. There is a vast collection in this pit of all types. Many of the *Mesembryanthemums* of the various types that are being sent out under new names, seedling *Cacti* of different genera, *Crasulacae*, *Cotyledons*, *Sedums*, *Kalanchoes*, *Aloes*, *Agaves*, *Euphorbias* and *Echeverias*. Most of these are in the small stage but will some day go to enrich the collection. To anyone interested in succulents there is much of interest here and time would be well spent in going through the collection.

Several of the specific names mentioned here are not to be found in the Kew Index; these are marked with an asterisk.

D. W.,
Edinburgh.

[The photographs are copyright by D. Wilkie.]

Subscriptions

THE Hon. Treasurer would like to make it clear that subscriptions are dated from the beginning of the quarter during which the member joins; thus members enrolled between January 1st and the end of March are held to have joined on January 1st; those enrolled between April 1st and the end of June are considered as joining on April 1st and their subscriptions are renewable on that date. If preferred, subscriptions can be made renewable on January 1st by paying for the part of the year at the rate of 2/6 per quarter.

Page Fifty-two

Editorial

THIS issue of the JOURNAL will find the Cactus lover getting out his watering can once more that, by its judicious use, his plants may be aroused from their winter sleep. Some may already be showing signs of growth and during the next few weeks there will be fresh spines pushing up and buds appearing. The other succulents will have had some water during the winter but will also, in most cases, make fresh growth as spring comes. Some people seem to think that the reason for not watering cacti during the winter is because they are then inclined to rot. But plants which have adopted a succulent habit normally experience extreme drought at some period of the year; and to keep the plants growing true to type and flowering well, this dry period must be allowed them in cultivation. Plants from the Americas are generally adaptable and will change their growing period to conform with our seasons; since damp in winter is apt to be prejudicial it is usual to give cacti their dry period during the colder months here. So that the abstention from watering during certain months is a necessity for healthy growth in cacti; whilst the adoption of our winter for this resting period is an accommodation to our climatic conditions which plants from the Americas will tolerate.

Plants from South Africa, on the other hand, are much less ready to conform to our seasons; the *Mesembryanthemums* prefer to flower with us during autumn and early winter (springtime in South Africa) and therefore require their resting period in spring and early summer, which is then winter in their native habitat. It is this lack of the power of accommodation that makes South African plants, on the whole, more difficult to grow in our climate than American ones; for even the protection of a greenhouse and suitable heating cannot produce the conditions of their native habitat. It may be that the lack of sun is the chief difficulty; this opens up the possibility of using artificial sunlight, and experiments in this direction would probably lead to interesting results.

As you watch your plants grow, remember that the Cactus Exhibition is on July 24th this year and that other members are looking forward to seeing some of your plants as much as you are hoping to see what other people are growing.

Conophytum novicium, N.E.Br.

Stemless. Growths 4-5 lines long and about 3 lines in diameter, when circular at the top, or when oblong in outline $3\frac{1}{2}$ - $4\frac{1}{2}$ lines broad and $2\frac{1}{2}$ -3 lines thick, flattish convex on the top, with a very slight depression or slight notch at the orifice, smooth, glabrous, somewhat grass-green, not at all glaucous and not purple on the sides, irregularly sprinkled with separate dark green dots and the orifice irregularly outlined with dark green. Ovary included in the growth, Calyx 4-lobed, membranous, entirely whitish; tube far exserted, 3 lines long, slender; lobes small, $\frac{1}{3}$ - $\frac{1}{2}$ line long, roundish, very obtuse. Corolla about $\frac{1}{2}$ inch in diameter, opening in the morning, closing between 2 and 3 p.m., not scented; tube slender about 4 - $4\frac{1}{2}$ lines long, exserted from the calyx, pale yellow; petals about 20, in 1-2 series, rather lax, 3 - $3\frac{1}{2}$ lines long, $\frac{1}{3}$ - $\frac{1}{2}$ line broad, obtuse or notched at the apex, bright clear yellow to the base, very shining. Stamens not very numerous, in about 4 lax series, the anthers of the lowest series at about the middle of the corolla-tube, the uppermost exserted; filaments and anthers of a lighter yellow than the petals. Style exserted beyond the anthers, $5\frac{1}{2}$ lines long, yellow; stigmas 4, minute and about $\frac{1}{2}$ line long, yellow.

Little Namaqualand: locality unknown, Marloth 13545.

Conophytum parviflorum, N.E.Br.

Stemless. Growths 3-5 lines long, 3-6 lines broad and 3-6 lines thick, obconic, circular to oblong in outline at the top, which is usually truncate, with a shallow depression across it, with the flat surface sloping upwards to the margin on each side of the orifice, or occasionally the top is depressed at the centre in a crater-like manner; orifice 1 - $1\frac{1}{2}$ line long; surface glabrous, dark purplish on the sides, and the top either grey-green or, when fully exposed to the sun, prettily suffused with carmine-rose, sprinkled irregularly with blackish green dots, all separate or occasionally with a few confluent into a short line, but not forming a regular pattern and not raised; orifice rosy. Calyx 5-lobed, with the ovary included in the growth; tube $1\frac{1}{4}$ - $1\frac{1}{2}$ line long, pale greenish-white; lobes less than $\frac{1}{2}$ line long, deltoid-ovate, acute or subacute,

dull red. Corolla very small and insignificant, 2 - $2\frac{1}{2}$ lines in diameter, expanding in the evening, scentless; tube exceeding the calyx-lobes and about $2\frac{1}{2}$ lines long, whitish; petals about 24-27, lax, in 2-3 series, the outer 1 - $1\frac{3}{4}$ line long, the inner much shorter, $\frac{1}{6}$ - $\frac{1}{8}$ line broad, acute or subacute, white. Stamens 18-20 in two series, all attaining to about the same height, with the anthers just exserted; filaments white; anthers pale yellow. Glandular ring light green. Style $\frac{3}{4}$ line long, pale greenish white; stigmas 5, about $\frac{3}{4}$ line long, pale greenish white, not attaining to half the length of the stamens.

Clanwilliam Division: growing in cracks of sandstone near Clanwilliam, Pole Evans 6019.

Although its flowers are very insignificant, it is a very pretty plant when nicely coloured from full exposure to sun.

Conophytum pumilum, N.E.Br.

Stemless. Growths 3-5 lines long, 2-4 lines broad and 2 - $3\frac{1}{2}$ lines thick, obconic, circular or elliptic in outline as seen from above; the smaller growths are convex on the top with the orifice not or scarcely depressed, and the larger growths have a distinct notch or transverse depression at the top, with the orifice in it; the orifice is 1 - $1\frac{1}{2}$ line long and has a dimple-like depression at each end; surface smooth, glabrous, chalky green, some growths entirely without dots, others with here and there a dot of darker green. Flowers not seen.

Little Namaqualand: from east of Steinkopf. Pole Evans 4.

The species with a smooth, chalky green, firm surface seem to flower much less freely under cultivation than most kinds, and imported plants seem to support the probability that they do not flower very freely under natural conditions, I have several kinds that have not flowered with me after several years of cultivation.

N. E. BROWN.

Catalogue received. Curt Backeberg, Volkshof, Bez. Hamburg. Seeds of Cacti and Succulents, including those collected during the 1933 expedition to S. America.

Annual Meeting

THE second Annual Meeting was held on January 23rd, 1934 at the Royal Horticultural Hall. The Chairman, Mr. R. S. Farden, expressed the sorrow felt by the members at the death of the President, Sir William Lawrence, who had done so much to help the Society.

The report of the Council for 1933 (see below) and the Balance Sheet were presented and adopted. The election of Officers and Council then took place: Lord Scone, M.P. had consented to accept the Presidency and was warmly welcomed to this office. Mrs. V. Higgins and Mr. J. Haddon were re-appointed Hon. Secretary and Hon. Treasurer and Mrs. B. E. Craig and Mr. C. T. Lloyd were elected to fill the vacancies on the Council. Mr. W. F. Athawes was elected Auditor for 1934.

The proposed alteration to Rule 12 was unanimously adopted and this rule now reads:—

“The Council shall have power to form local branches; members of local branches shall be members of the Society and pay their dues to the Society's Treasurer; the local Secretary (or Treasurer, if one be appointed) may apply to the Hon. Treasurer of the Society for an amount to cover the local expenses; this amount shall depend on the number of members belonging to the branch and shall not be more than 25 per cent. of each subscription.”

Report of the Council for 1933

THE Council are pleased to be able to report that the Society has made substantial progress during the past year.

The number of members at the time of the last Annual Meeting was 291; since then 90 new members have been enrolled and seven have resigned, bringing the present total to 374; five full and eight associate members have failed to pay their subscriptions for 1933, so that the active membership list on December 31st was 361; of these 334 are full members and 27 are associates.

The activities of the Society during the year have continued; the JOURNAL has appeared quarterly and it has been found possible to increase the size from the original twelve to twenty pages. The JOURNAL is

sent abroad to South Africa, Australia, Canada, India, America as well as to the Continent.

Meetings have been held monthly in London and have been well attended; the Council would like to thank the lecturers who have assisted at these meetings. The subjects dealt with were as follows:—

January ..	Mr. F. J. Chittenden on Succulence and Succulent Plants.
March ..	Exhibition of plants, etc.
April ..	Mr. W. G. Theobald on Cotyledons and Echeverias.
May ..	Mr. O'Donoghue on Hairs and Spines.
July ..	Mr. de Vries on Cacti from an artistic point of view.
September ..	Mrs. V. Higgins on Root Systems.
October ..	Herr Backeberg showed a Cinematograph Film.
November ..	Discussion on Soils.
December ..	Dr. Marrable on Euphorbias.

The first Local Branch of the Society has been formed, the Liverpool and District Branch, which holds meetings locally.

In June the Society held its first Exhibition in the R.H.S. Old Hall; the number of entries received and the number of people visiting the Show was very gratifying.

Books have been added to the Library during the year, by gift and purchase, and the publications of kindred Societies in America, Holland, Germany, Belgium and Czecho-Slovakia are regularly received.

The Council would like to express their thanks to the authorities of the Royal Horticultural Society for assistance during the year, and to the Press for kindly inserting notices of the Societies activities and other matters of interest to Cactus growers.

Mammillaria Ocamponis

With reference to the photograph of *Mammillaria ocampensis* in the CACTUS JOURNAL, vol. II, No. 1, p. 15, Mr. Boarder has received a note from Herr F. A. Haage, Jun., Erfurt, from whom he obtained the seed, in which Herr Haage says that the plant is the true *M. ocampensis* from Ochoterena, but is not *M. Mercadensis*. He thinks that Dr. Rose had not seen the species in flower or he would not have grouped *M. ocampensis* and *M. Mercadensis* as synonyms. *M. longiflora* is a flatter growing plant.

Why Join a Specialist Society?

MAY I be permitted to put forward a few reasons? I have seen the great pleasure, the intense enthusiasm and the great help given to others with kindred likes by some of the great specialists. I have been permitted during my career to have met some of the masters—The Very Rev. Dean Hole on roses, Prof. Sir Michael Foster with irises, The Rev. F. D. Horner and old Ben Simonite with auriculas and polyanthus, John S. Hedderley with carnations and Chater with his tulips and hollyhocks. These have all been an inspiration to the specialist idea and to have seen their intense pleasure on meeting some fellow enthusiast was an all sufficient answer to the question at the start of this short note. Such pleasure is not for the ordinary amateur or hobbyist who is forever pursuing the “will o’ the wisp” kind of gardening, in which their fancies change with each month or more often, and instead of being in with all their fellow specialists, like members of a specialist society, they are always just behind; as for instance, the person who takes up sweet peas in the spring, to find he ought to have prepared his ground in November, or the rose lover who plants in March, and so on in lesser degree, by those who see a pretty thing and want some like it, forgetting that to have attained that success, much unseen preparation and forethought has been needed.

By joining the Cactus Society, a lover of such plants meets fellow enthusiasts, gets numberless little hints, perhaps not much in themselves singly, but all helpful to the keen specialist. The best literature on any subject is always expensive and often prohibitive to many, but the members of such a society usually help each other by obtaining mutually the more authoritative books, etc. and the pleasure of meeting among your own plants, a fellow enthusiast with a mind above Paul Crampel and lobelia is not the least of the pleasures.

I have many times been asked for advice on what to grow and I have invariably tried to turn the person into a specialist, no matter how small, taking into consideration the other factors, such as means, accommodation, locality, etc. Try to grow well something, however humble. The more we learn, the more we find there is to learn and the greater the pleasure when we have learned it, and are

able to pass it on to another, for on such a wide subject as gardening, we none of us know all.

Our Society consists of lovers of a class of plant that have many features that are attractive to a very wide circle. It can be most absorbing to the small grower with only a window case or shelf, and can be extended as means, etc. increase to an almost unlimited extent. Cacti are not too exacting in their requirements, especially in the short days and long evenings, when the fireside and a few appropriate books and catalogues seem more enticing; also in many of them you have their beauties of form etc. before you for at least fifty weeks each year and possible flowers the other two weeks.

I do not know any other class of plant of which so great a variety can be accommodated in so limited a space and of which it can truly be said, “The more you have the more you want,” and as a finish I would say to any beginner: “Join the Cactus Society and you will soon be an enthusiast.”

G. LAMB.



The above photograph was taken by Mr. George Lamb about 1895 and shows a very large plant of *Aloe plicatilis* in the University Botanic Garden, Cambridge. Another photograph in Mr. Lamb's possession shows the same plant in 1892 being moved when the new range of houses was being erected; the total weight, together with the box in which it was growing, was estimated as about one ton, and the plant had to be got into position before the side of the house was built in. This magnificent plant flourished for many years in the Cambridge Gardens, but finally died from basal rot, that arch-enemy of these heavy succulents, when grown in an erect position.

Succulents

Other than Cactaceae and Mesembryanthemae

By R. S. Farden

(Continued from page 38)

Sub-family C. COTYLEDONOIDEAE.

Berger divides this sub-family into six genera :—

- | | |
|--------------------|-----------------------|
| C 9. Cotyledon. | C 12. Chiastophyllum. |
| C 10. Adromischus. | C 13. Pistorinia. |
| C 11. Umbilicus. | C 14. Mucizona. |

Genus C 9. Cotyledon.

The flowers are large, green, yellow, or red, and often nodding and borne in a terminal inflorescence. The plants are succulent shrubs, a few are hairy and some are mealy; the leaves are opposite or alternate, and fleshy. They all come from South Africa.

Berger gives 55 species, of which 25 are of greenhouse rank :—

- | | |
|------------------|----------------|
| C. coruscum. | C. Barbeyi. |
| C. cuneata. | C. tomentosa. |
| C. crassifolia. | C. decussata. |
| C. ramossima. | C. mucronata. |
| C. rotundifolia. | C. papillaris. |
| C. „ v. elata. | C. gracilis. |
| C. „ v. ramosa. | C. paniculata. |
| C. „ v. obovata. | C. Eckloniana. |
| C. „ v. oblonga. | C. eretifolia. |
| C. velutina. | C. ventricosa. |
| C. caccalioides. | C. reticulata. |
| C. orbiculata. | C. racemosa. |
| C. tuberculosa. | C. undulata. |
| C. Wallichii. | C. macrantha. |

Genus C 10. Adromischus.

The name is from the Greek hadros = thick, and michos = stem.

The flowers are whitish, or greenish, or reddish and borne in terminal racemes or spikes, small elongated bells pointing upwards. The plants are succulent with alternate fleshy leaves, flat or cylindrical and flecked with brown. They are very slow growing and are all from South Africa.

Berger lists 19 species, of which 9 are of greenhouse rank :—

- | | |
|------------------|-------------------|
| A. rhombifolius. | A. mamillaris. |
| A. triflorus. | A. jasminiflorus. |
| A. maculatus. | A. robustus. |
| A. cristatus. | A. clavifolius. |
| A. Bolusii. | A. hemisphericus. |

Genus C 11. Umbilicus.

The flowers are inconspicuous, yellow or green, in racemes; in *U. pendulinus* the raceme is 4–6 ft. long. The plants are deciduous, persisting by means of perennial

tubers. They are found in the Eastern Mediterranean, including Greece, Crete, Asia Minor and extend to Spain, Portugal and England; one species comes from Abyssinia.

Berger lists 16 species, none of which are in cultivation.

Genus C 12. Chiastophyllum.

The flowers are small and yellowish and are borne in loose terminal spikes. There is only one species, a straggling plant throwing roots from the branches; it comes from West Caucasus and is in cultivation.

C. oppositifolium.

Genus C 13. Pistorinia.

The flowers are in racemes in a large bunch, like *Rochea falcata*; the leaves are elongated, marked with dashes and ciliated on the edges.

Berger gives 2 species, both of greenhouse rank :—

- | | |
|---------------|----------------|
| P. hispanica. | P. breviflora. |
|---------------|----------------|

Genus C 14. Mucizonia.

The flowers are in one-sided bristly racemes. The plants are annuals and resemble Sedums.

Berger gives only one species, which is not in cultivation and comes from Spain, Morocco and the Canaries :—

M. hispida.

N.B.—It has been placed in Sedum, Cotyledon and Umbilicus.

Sub-family D. SEMPERVIVOIDEAE.

This is divided into five genera :—

- | | |
|--------------------|------------------|
| D 15. Sempervivum. | D 18. Aichryson. |
| D 16. Aeonium. | D 19. Monanthes. |
| D 17. Greenovia. | |

Genus D 15. Sempervivum.

This genus is most conflicting in as much as the species interbreed very freely; most of the crosses get names, but they are only varieties, not true species.

The flowers are large, white, yellow, pink or red, carried on branched, leafy inflorescences; the stem is often coloured as well as the flowers. The plants have their fleshy leaves arranged, as a rule, in basal rosettes; the edges of the leaves are sometimes hairy and sometimes coloured. The rosettes usually

die after flowering, but offshoots arise from them. They are distributed across the mountains of Southern Europe from Spain to the Caucasus.

Berger gives 22 species with red flowers and 11 with yellow. The genus is divided into 2 sub-sections :—

D 15a. Eusempervivum. D 15b. Jovisbarba.

In this case I give the whole list of species, marking with an asterisk those mentioned by Berger as being in cultivation.

Sub-section D 15a. Eusempervivum.

- | | |
|--------------------|-------------------|
| *S. calcareum. | S. versicolor. |
| *S. tectorem. | S. alpinus. |
| S. Widderi. | S. Beaticum. |
| S. Schottii. | S. atlanticum. |
| *S. pumilum. | S. minutum. |
| *S. flageliformis. | *S. Schechanii. |
| *S. Funkii. | *S. arvernense. |
| *S. erythraeum. | *S. dolomiticum. |
| *S. montanum. | *S. arachnoideum. |
| S. Moggridgei. | S. Haussmannii. |
| S. fimbriatum. | |

Sub-section D 15b. Jovisbarba.

- | | |
|------------------|-----------------|
| *S. gaudina. | *S. Kindingeri. |
| *S. Borisii. | *S. globiferum. |
| *S. Heuffelli. | *S. Allionii. |
| *S. glabrum. | *S. hirtum. |
| *S. soboliferum. | *S. leucanthum. |
| *S. arenarium. | |

There are over 200 garden varieties. Lloyd Praeger's Monograph published by the Royal Horticultural Society in 1932 is the latest work on the subject.

Genus D 16. Aeonium.

The flowers are white, yellow or reddish, in a large terminal inflorescence. *The plants* are in rosette form. They come mostly from the Canary Isles, Teneriffe, Morocco and the Mediterranean; the name comes from the Greek aionion = eternal, the equivalent to Sempervivum in Latin, always living, referring to its drought-resisting nature.

Berger enumerates 48 species, of which the following are in cultivation :—

- | | |
|------------------|---------------------|
| A. Goochiae. | A. Webbii. |
| A. sedifolium. | A. Castello-Paivae. |
| A. glutinosum. | A. holochrysum. |
| A. glandulosum. | A. balsamiferum. |
| A. canariense. | A. undulatum. |
| A. Palmense. | A. chrysanthum. |
| A. nobile. | A. Lindleyi. |
| A. ciliatum. | A. tortuosum. |
| A. domesticum. | A. viscatum. |
| A. decorum. | A. spatulum. |
| A. arboreum. | A. tabulaeforme. |
| A. Manriqueorum. | A. urbicum. |

- | | |
|---------------|-----------------|
| A. gorgoneum. | A. caespitosum. |
| A. aurea. | A. Smithii. |
| A. Haworthia. | A. cuneatum. |
| A. Gomerense. | |

Genus D 17. Greenovia.

Named after George Bellas Greenough, a geologist.

The flowers are golden, carried in leafy, terminal inflorescences. *The plants* are stemless or with only a short stalk; the leaves are in a rosette, which at one period of the year is tightly drawn together, forming a hollow or cup in the centre of the plant. These are found growing on rocks in the Canary Isles.

There are four species only one of which is of greenhouse rank :—

- G. aurea syn. Bollei.

Genus D 18. Aichryson.

The flowers are yellow and in a loose inflorescence. *The plants* are annuals, mostly slender and often with glandular hairs. The name is from the Greek aci = ever, and chryson = golden. They are found in the Canary Isles.

Berger gives 11 species only three of which are of greenhouse rank :—

- | |
|----------------|
| A. dichotomum. |
| A. punctatum. |
| A. divaricum. |

Genus D 19. Monanthes.

The flowers are long-stalked and solitary or with few flowered inflorescences; inconspicuous. *The plants* are slender branched herbs or have rosettes; the leaves are few, opposite and succulent, sometimes smooth and sometimes papillose. These are also from the Canary Isles and *M. atlantica* from the Atlas Mountains.

Berger gives 11 species, four of greenhouse rank :—

- | | |
|---------------|----------------|
| M. anagensis. | M. muralis. |
| M. laxiflora. | M. polyphylla. |

Sub-family E. SEDOIDEAE.

From the Latin sedere = to sit, that is trailing on stones and rocks. The name was given by Pliny the Younger 61-113 A.D.

The flowers are stalked or sessile, white, yellow, occasionally red, rarely blue and carried in branched inflorescences. *The plants* are herbs or small shrubs and very various in habit; the stem is fleshy, occasionally woody, erect or trailing; the fleshy leaves are generally alternate and often cylindrical. *Habitat* all over the Northern

Hemisphere, but chiefly round the Mediterranean and Asia Minor.

Berger lists about 356 species with an average of four varieties to each; this makes about 1,500 varieties, a truly monumental work. At times they have been put into every possible and impossible genus such as *Crassula*, *Cotyledon*, *Sempervivum*, etc. Berger divides them into nine genera:—

- | | |
|-----------------------------|------------------------------|
| E 20. <i>Sedum</i> . | E 25. <i>Rosularia</i> . |
| E 21. <i>Sinocrassula</i> . | E 26. <i>Afrovivella</i> . |
| E 22. <i>Diamorpha</i> . | E 27. <i>Sempervivella</i> . |
| E 23. <i>Orostachys</i> . | E 28. <i>Hypagophytum</i> . |
| E 24. <i>Pseudosedum</i> . | |

Genus E 20. *Sedum*.

Most *Sedums* are of northern origin and hardy in this country; only a few need greenhouse protection. For details of this large genus the reader is referred to the Monograph, "An Account of the Genus *Sedum* as found in Cultivation," by R. Lloyd Praeger, *R.H.S. Journal*, vol xlvi, 1921.

Genus E 21. *Sinocrassula*.

The flowers are white or red and are borne on branched inflorescences. *The plants* form rosettes and are perennial or annual. They are related to the *Crassulas* but the leaves are alternate, and to the *Sedums* but there are 5 instead of 10 stamens. *Habitat* from the Himalayas to Western China.

Berger gives 7 species of which 3 are in cultivation:—
S. indica. *S. densirosulata*. *S. yunnanensis*.

Genus E 22. *Diamorpha*.

There are two species, neither in cultivation, which might be referred to *Sedum*.

Genus E 23. *Orostachys*.

The flowers are borne on terminal inflorescences from rosettes which die after flowering. *The plants* have the leaves in rosettes like *Sempervivums*. *Habitat* from the Urals through Siberia to China and Japan.

There are 10 species of which 2 are in cultivation:—
O. spinosus. *O. Chanetii*.

Genus E 24. *Pseudosedum*.

The flowers are short-stalked and in a compressed, branched spike. *The plants* are herbs similar to *Sedums* but with a large woody rootstock; the stem dies down annually.

Neither of the two species are in cultivation.

Genus E 25. *Rosularia*.

The flowers are red, white or yellow and borne in terminal or axillary inflorescences. *The plants* form low rosettes, with offshoots, so that they soon form clumps very similar to *Sempervivums*. *Habitat* Eastern Asia.

There are 15 species, of which 2 are in cultivation:—
R. sempervivum. *R. pallida*.

Genus E 26. *Afrovivella*.

The one species from Abyssinia resembles a *Sempervivum* or *Rosularia* and is not in cultivation.

Genus E 27. *Sempervivella*.

The flowers are white or pink and are borne in the axils, erect or recumbent. *The plants* are low herbs forming rosettes with runners; the leaves are narrow and fleshy. They come from the Western Himalayas.

There are 4 species, one being in cultivation:—
S. alba.

Genus E 28. *Hypagophytum*.

The only species comes from Abyssinia; it was formerly regarded as an *Aichryson* and is not in cultivation.

Sub-family F. ECHEVERIODEAE.

Berger divides this sub-family into five genera:—

- | | |
|----------------------------|----------------------------|
| F 29. <i>Villadia</i> . | F 32. <i>Echeveria</i> . |
| F 30. <i>Altamiranoa</i> . | F 33. <i>Pachyphytum</i> . |
| F 31. <i>Lenophyllum</i> . | |

Genus F 29. *Villadia*.

The flowers are small and borne in racemes. *The plants* are perennial, often with a woody rootstock; the leaves are alternate, cylindrical and short. *Habitat* Mexico.

One of the 15 species is in cultivation:—
V. imbricata.

Genus F 30. *Altamiranoa*.

The flowers are borne in one-sided racemes. *The plants* are annuals or perennials, resembling *Sedums*, with weak stems and small leaves.

Only one of the 19 species is in cultivation:—
A. elongata.

(To be continued)

Book Reviews

"THE STAPELIEAE," by Alain White and Boyd L. Sloane, printed by the Abbey San Encino Press and distributed by the *White and Sloane Stapelia Collection*, 1421, Dominion Avenue, Pasadena, California. Price 3 dollars.

The family Asclepiadaceae is of particular interest from the peculiar formation of the flowers, the characteristic features of the family being the union of the pollen into waxy masses, somewhat resembling the pollinia of orchids, and the mechanism for their transfer by insects to the stigmatic surfaces of neighbouring flowers. The 200 genera which comprise this family are mainly tropical although a few are found in temperate regions. Several of the genera exhibit succulent habits, in particular the Stapelieae and some of the Ceropegieae. Collectors of succulents are especially interested in the genus *Stapelia* and its close allies, among which may be mentioned *Caralluma*, *Duvalia*, *Echidnopsis*, *Hoodia*, *Huernia*, *Piранthus* and *Trichocaulon*. Up to the present time the chief sources of information regarding these plants have been the *Flora of Tropical Africa*, 1904, *Flora Capensis*, 1909, and Berger's *Stapelieen und Kleinien*, 1910. Since the dates of these publications numerous species have been discovered and for descriptions recourse must be had to a large number of botanical journals. The publication of THE STAPELIEAE by Alain White and Boyd L. Sloane will therefore be very warmly welcomed by all interested in this group of plants. This work comprises an Introduction, Chronological Notes, Descriptions of Genera and Species and several Appendices. The whole forms a very comprehensive study of the tribe Stapelieae and is presented in a particularly readable and attractive form.

The introduction deals first with the main botanical characteristics of the tribe, the basis of differentiation of the genera, their geographical distribution, with a discussion of the probable lines of evolution, together with many interesting notes of a more general nature.

The second section traces in a series of chronological notes the discovery of the plants comprising the Stapelieae from the days of Justus Heurnius, circa 1630, to the present time. The scheme followed is to review the work of each of the travellers and botanists who have contributed to the discovery and identification of the plants in

order of the periods during which they were engaged on the subject. It is clear that much historical research has been involved in compiling this section and the biographical information given will add largely to the enjoyment with which this book will be read. The inclusion of portraits of some of the more prominent workers, among whom may be mentioned Dr. Rudolph Marloth, Dr. N. E. Brown and Alwin Berger, will also be greatly appreciated. The section entitled Cultural Notes gives useful information regarding the care of plants in collections and the methods of propagation; the authors point out that the cultural directions apply particularly to the conditions obtaining in California, where the White and Sloane *Stapelia* Collection is maintained, but cultivators elsewhere should experience no difficulty in making those modifications necessary in other localities, as the general principles are so clearly set out. Naturally the main section of the book is devoted to detailed descriptions of the genera and species; the latter number over 300 and the authors are to be congratulated on the clear way in which the plants are described and are differentiated from closely allied species. Appendix A is a reprint of an article by the authors on Justus Heurnius, the first European known to collect plants from South Africa. Appendix B is from another article by the authors dealing with the Stapeliads of Nicolas Witsen and Paul Hermann, which was described in the works of Linnaeus. Members of the Cactus and Succulent Society of Great Britain will be interested to find in Appendix C an extract from the article by Dr. N. E. Brown, "About Succulent Plants," which appeared in the CACTUS JOURNAL in December, 1932. Appendix D is a contribution on the local names of Indian *Carallumas*. In Appendix E are set out the views of Dr. Brown on the very important subject of the sub-division of the genera *Caralluma* and *Stapelia*, extracted from certain articles by him. Appendix F gives a list of Stapeliads recently discovered or not cited in the three important works mentioned earlier in this review. Finally there is a full index of genera, species and varieties, a list of synonyms and hybrids and an index of the botanists who have contributed to the literature of the Stapelieae.

The general standard of production of the volume is very high and careful attention to the type used for the botanical names avoids any possibility of confusion in referring to any individual item. A feature of the book is the excellence of the illustrations. A large

proportion of the species described are represented by photographs drawn from a number of sources; the majority, however, are photographs by Boyd L. Sloane from plants in the White and Sloane Collection at Pasadena; these photographs and the list of plants growing there, indicate what a wonderful collection has been got together by the authors. A few of the illustrations are reproductions of early drawings and remind us of the charm and beauty of the older botanical works. Particular reference must be made to the excellence of the reproduction in colour as frontispiece, of an early aquatint by Henderson, London, 1801, while the wonderful photograph of *Duvalia polita*, taken as the seed pods were bursting, will excite the admiration of all plant lovers. In conclusion, we are glad to note that the price of the volume has been kept very low compared with so many publications from the States and we hope the authors will, in consequence, secure the wide circulation that is so well deserved of this very complete work.

“BLAETTER FUER KAKTEENFORSCHUNG,” published by Curt Backeberg, Volksdorf, Bez. Hamburg; issued monthly, price 6/- per annum.

The January and February numbers of this publication have now appeared; the first, besides an Introductory Note, contains the characteristics of the genus *Lobivia* and descriptions of *Lobivia Haageana*, *L. Nealeana* and *L. Hertrichiana*, each one illustrated by a photograph. The February issue gives the characteristics of the genera *Echinopsis*, *Mediolobivia* and *Rebutia* and descriptions of *Echinopsis violacea*, *Mediolobivia aureiflora* and *M. aureiflora v. longiseta*, *M. boederkeriana* and *Rebutia Spegazziniana*. The text is in German, English, Dutch and French throughout. The colour of the flowers is referred to the colour chart of Benary, which is an adaptation of that proposed by Ostwald and adopted by the International Botanical Congress for use in botanical work. In the descriptions the colour is given in less accurate but more familiar terms so that the reader can get some impression of the appearance, using the chart where greater accuracy is desired. The reproduction of the illustrations is excellent and the printing and arrangement clear and good; this publication promises to be extremely useful to any one interested in the accurate determination of the newer species.

Namaqualand

THE following description of the vegetation of Namaqualand, the home of so many interesting succulents, is taken from a letter from Mrs. van der Bijl, who visited this part of the country in October, 1933:—

“I had a lovely trip to Namaqualand in October to see the flowers. The first day we saw mile upon mile of *Mesembryanthemums* in flower, some low like a carpet and the bushy ones above them, as far as one could see; then the next day we were at Nieuwbrondtville, high up in the mountains, and there were bulbs of all sorts, and we visited a garden of purely South African bulbs, in full bloom; it was a wonderful sight. Then we went on to Van Rijn's Dorp and the succulents!—of course we collected here. Then on to Springbok, and there the flowers were too wonderful to describe—just miles of them, mostly daisies, yellow, orange and red, with a large *Mesemb.* keeping them company; blue carpets of small daisies and a taller blue flower; sometimes the small blue ones form a carpet, with the orange above it, sometimes the orange is low and the blue flower over it. We went as far as Concordia. On our return there were masses of a tall yellow bush in the Robertson district, quite as wonderful as anything we had seen in Namaqualand. To say we were pleased with our trip is to put it mildly. We found many things new to us, of course, and they are doing very well on the rockeries. For the first time I saw Elephant's Foot growing really well, from quite small ones to some that must be hundreds of years old; that was in Clanwilliam.”

Amateurs' Flower Show

On June 19th, the Royal Horticultural Society is holding the tenth Amateurs' Flower Show; this show is reserved for amateur growers and there are a large number of classes, covering a wide range. Three classes are of special interest to members of this Society; one requires a group of Cacti and Succulents on a table space 6 by 3 ft.; another requires 8 plants; and the third, reserved for those who do not employ a gardener, requires 3 specimen plants. Full particulars and schedules can be obtained on application to the Secretary, Royal Horticultural Society, Vincent Square, London, S.W.1.

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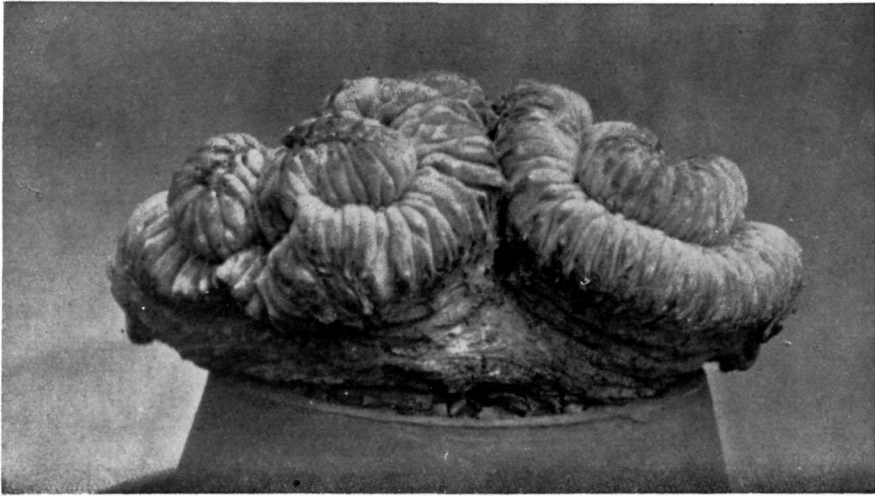
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Lophophora Williamsii cristata.

Cristates

FROM time to time cacti are found in nature or occur in cultivation whose appearance shows that they have departed from the normal manner of growth; cylindrical types may spread out fan-wise, or spherical plants may grow side-ways till they form convoluted masses. Such forms are known as crested plants or cristates. The reason for the abnormal growth is that, instead of remaining a centre of origin, producing new material equally in all directions, the growing point becomes a line and continues to grow thus, while making normal growth only in a lateral direction. The cause underlying the abnormality is not understood. It was thought at one time that mechanical damage to the growing point would produce cristates; but this is seldom, if ever, the case; such damage results in an effort on

the part of the plant to overcome the disability; growths are formed which may at first resemble cristates, but, when fully developed, they are found to be offsets, similar in form to the parent plant. And damage of a mechanical nature will destroy considerably more tissue than the growing point itself. It seems, however, that the cause must be some change in the constitution of the cell or cells which are responsible for the increase in size of the plant; possibly disease might have this effect, as is seen in other plants in the abnormal stimulation to growth produced, for instance, in wild roses and commonly called "Robin's Pin-cushions." On the other hand, it may be more closely allied to fasciation, by which is meant, botanically, the joining together or duplication of normal structures.

Whatever the cause, it has not been found possible to induce an otherwise normal plant to become cristate under cultivation; cases are reported of plants having changed from the normal to the cristate form, but the factor responsible has not been obvious. It is sometimes thought that a rich soil tends to the production of cristates, and certainly, under poor conditions, crested plants have sometimes shown a tendency to revert to normal.

Cristates flower in the same way as normal plants and the seed produced generally

Since they are of rare occurrence a good specimen may be very valuable; high prices have been paid from time to time and many collectors prize their cristates highly. On the other hand, other growers regard them as malformations or diseased plants and want nothing to do with them. Undoubtedly they are of scientific interest if only because we do not yet know why or how they occur.

Euphorbias at La Mortola

IN 1897 there was published the "Alphabetical Catalogue of Plants growing in the Open Air in the Gardens of Thomas Hanbury, F.L.S., La Mortola, near Ventimiglia, Italy," compiled by K. Dinter. These gardens have long been famous for the wonderful collection of succulent plants grown there and, since the succulent Euphorbias are now being grown more extensively by collectors, it will be of interest to give a list of those growing at La Mortola in 1897, taken from the above-mentioned catalogue:—



Ariocarpus fissuratus cristata.

yields a small percentage of seedlings which become cristate in their turn, the rest being normal; so that it would seem that, whatever the cause may be, it can be inherited and therefore is intimately connected with the cell-structure of the plant.

A large number of species of cacti are known to form cristates from time to time; various Mammillarias, *M. Wildii* for instance, form large convoluted masses as growth proceeds; some species of *Echinopsis* form cristates and, in nature, the white-haired *Espostoa* (*Cereus*) *lanata* has been found with enormous crests, whilst *Carnegiea gigantea* has produced some extraordinary forms. Less common are the cristate forms of *Lophophora* (*Anhalonium*) *Williamsii* and *Ariocarpus fissuratus*, both of which are illustrated here from photographs of plants in the possession of Capt. E. J. W. Noakes, who has a fine collection of crested plants.

Opinion as to the attractiveness or otherwise of cristates is divided, widely divided apparently, for there seems to be no middle way.

- | | |
|--------------------------------|---|
| <i>E. abyssinica</i> Raeusch. | <i>E. neriifolia</i> Lin. |
| <i>E. anacantha</i> Ait. | <i>E. oblongata</i> Grieseb |
| <i>E. atropurpurea</i> Brouss. | <i>E. officinarum</i> Lin. |
| <i>E. Berthelothii</i> Bolle. | <i>E. Ornithopis</i> Jacq. |
| <i>E. biglandulosa</i> Desf. | <i>E. paralias</i> Lin. |
| <i>E. canariensis</i> Lin. | <i>E. pendula</i> D.C. |
| <i>E. ceratocarpa</i> Ten. | <i>E. peplis</i> Lin. |
| <i>E. cereiformis</i> Lin. | <i>E. peplus</i> Lin. |
| <i>E. chamaesyce</i> Lin. | <i>E. Regis Jubae</i> Webb and Berth. |
| <i>E. Characias</i> Lin. | <i>E. resinifera</i> Berg. |
| <i>E. clandestina</i> Jacq. | <i>E. rhipsaloides</i> Lem. |
| <i>E. dendroides</i> Lin. | <i>E. Schimferiana</i> Hochst. |
| <i>E. exigua</i> Lin. | <i>E. segetalis</i> Lin. |
| <i>E. falcata</i> Lin. | <i>E. senata</i> Lin. |
| <i>E. globosa</i> Sims. | <i>E. spinosa</i> Lin. |
| <i>E. lactea</i> Haw | <i>E. splendens</i> Boj. |
| <i>E. lathys</i> Lin. | <i>E. verrucosa</i> Lam. |
| <i>E. mammillaris</i> Lin. | <i>E. virosa</i> Willd. |
| <i>E. myrsinites</i> Lin. | and in the Addenda, <i>E. grandidens</i> Haw. |

Some of the names in this list will be unfamiliar to present-day growers but the most noteworthy thing is the absence of the Cape types which are most highly prized to-day. Such plants as *Euphorbia globosa*, *meloformis*, *obesa* and others are conspicuous by their absence. It is only fair to say that in his book, *Sukkulente Euphorbien*, published in 1907, Alwin Berger, then Curator of these gardens, gives those Euphorbias which were growing at La Mortola at that time and that, owing largely to renewed importations at the beginning of the century, the number of interesting species had greatly increased.

Deserts, Dews and Spines

By C. D. O'Donoghue

(Résumé of a Talk given on April 20th, 1934)

MR. O'DONOGHUE began by saying that at school one was usually taught that a desert was a sandy place where nothing grew. Actually the chief factor causing the more extreme type of desert region is the shifting sand. There are deserts all over the world and they are increasing in area, for attempts at irrigation are often rendered futile because the canals become choked with the drifting sand. Cacti and other succulent plants do not come from this type of desert, but from regions where there is at least a reasonable rainfall; for the cactus is not a true desert plant, though it is capable of enduring periods of great drought. In the catalogue of plants grown at La Mortola, in Italy, there occurs the following sentence: "Mexican species thrive well at La Mortola, those from the United States and the Andes succeed less well and evidently find our climate too dry." And yet the Riviera is not generally regarded as a desert! Again, Mr. David Griffith in the "Bulletin of the U.S. Department of Agriculture," No. 60, says: "Prickly pears and other cacti are apparently inseparably connected in the public mind with drought and heat, but this conception of the requirements for their best development is far from perfect. Our driest deserts produce none of these plants in economic quantities and the same is true of our hottest regions. Rather than say they are adapted to conditions of extreme heat and drought, we should say that they thrive best in a region which has an equitable temperature and a considerable rainfall periodically distributed. There is certainly no region in the world where these plants grow naturally in such profusion as they do upon the plateau of Mexico, but this is not a hot country, neither is it excessively dry—it has considerable rainfall during the summer, and then the country looks like anything but a desert."

The question is, then, how does a plant obtain moisture between the periods of rain? Mr. O'Donoghue said that long ago he had been considerably puzzled by a fern growing on a slate roof and later by auriculas in Switzerland growing on a slab of stone. The explanation appears to be that they can make use of the dew; the slate roof and the slab of rock would act as condensers for dew. Pictures of cacti in nature usually show them growing where there are rocks near; in Abyssinia the tree Euphorbias are always

found growing beside a boulder which forms, in effect, a desert dew pond.

Prof. Dinter says that the Namib Desert is so dry that no large mammals can live; no ostriches, goats or antelopes are found there, yet there are many succulents. This is due to the fact that there is enough condensation from dew at night to moisten the sand to a depth of several metres, though this is dried out during the day time. Dr. Schwantes says that he does not know if all species of Conophytum live where there is dew, but in S.W. Africa, Conophytums only occur in the coast region which has dense sea fogs the whole year. Dr. Marloth has investigated the subject and finds that the lakes on Table Mountain—renowned for its covering of mist or "Tablecloth"—are filled by condensation of the sea mists.

Turning to the question of spines, it is easy to find that these afford protection and then to make the assumption that that is what they are for. But protection is incidental rather than the main purpose. To quote Prof. Compton of Kirstenbosch: "Spinescence appears to be a physiological reaction, rather than a protective adaptation." Mr. O'Donoghue showed examples of plants "protected" by spines, such as *Echinocereus Davisii*, *Opuntias*, *Echinocactus ingens*, and of others, such as *Lophophora Williamsii*, *Ariocarpus fissuratus*, *Euphorbia meloformis*, *Pelecypora pectinata*, where there are no spines to afford protection. In the case of *Echinocactus ingens* the young plant has few and small spines, whilst in the adult they are ferocious; yet surely a seedling needs more protection than a full-grown specimen. The explanation that spines are for protection is, in fact, too obvious to be fully satisfactory; the fact that they do, in some cases, afford protection is only secondary. Nor is the protection afforded very complete; llamas have very hard hooves and can kick a cactus to pieces. Beetles, woodpeckers, etc., are more dangerous to the plant, as a rule, than the larger animals, and yet, in many cases, spines give no protection against these. In the Galapagos Islands the giant tortoises feed on cacti; in fact, paths have been worn smooth across the rocks from the place where the tortoises live to their cactus-feeding grounds, and their gullets appear to have become especially toughened to resist the spines.

Mr. O'Donoghue had asked Herr Backeberg

what he considered was the use of spines, and he did not think that they were protective. For one thing, the llamas feed on the plants regardless of the spines, and for another, the Cerei in the High Andes are abundantly furnished with spines and yet there are no large animals in this district from which the cacti need protection. In his opinion they were connected with the absorption of water; dew or mist would tend to condense on the points and it is an established fact that the base of the areoles can absorb water, and so prevent undue shrivelling of the plant. In this connection, interesting observations have been made by a member of the Cactus Society, Mr. Bartingale, who is blind and, relying on the sense of touch, has noticed facts which might not be so apparent to the eye. He says: "I have noticed that on warm, sunny days, the hairs on the Old Man Cactus invariably stand up or outwards from the plant, whilst on cloudy days or during rain, they seem to hug the stem. I have also noted that my *Astrophytum capricornis senilis* behaves in a like manner; not only do the whiskery spines stand out, but they become quite stiff and sharp to the touch. On dull days these spines also subside and become quite soft. I have wondered whether this means that they absorb water from the atmosphere."

It seems to be clear that spines can help to collect water from moisture-laden air, and that dew, especially if there is bare sand or some cold substance to act as a condenser, may provide moisture for the plants growing in the districts where, at certain seasons at least, the rainfall is very scanty.

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Arrangements have been made with the publishers for binding together Volumes I and II of THE CACTUS JOURNAL in limp clothboards, with gold lettering. The price is 3s. od. per double volume. If you would like your copies bound, send them (with the index) to Blandford Press, Ltd., 43, Blandford Street, London, W.1, and they will be returned bound in a few days. Cash should be sent with order, and the publishers will pay postage one way. The monthly covers will not be bound except when specially ordered. Missing copies can be replaced at 1s. 6d. each, except Vol. I, No. 1, which is out of print.

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Brittonia Davisii

By C. A. Armstrong



Brittonia Davisii.

A FISHHOOK cactus, native to Western Texas, extending into the extreme north of old Mexico, it resembles a giant, large-tubercled *Mammillaria*, with individual dark green, fleshy tubercles, one and a half inches long and over an inch broad at the base, with a felted short groove at the tip; 8 to 12 radial spines, two inches long, interlacing, about six straight, sharp, stiff, spreading central spines, brilliant red when young, and one white, slightly curved, distinctly hooked, central up to five inches long; the flowers borne at the opposite end of the groove from the spine-areole, two and a half inches across, scintillate from lemon yellow to deep gold with a metallic sheen in the sunlight. I was more than delighted with the three flowers that bloomed this past summer on the pictured specimen in my garden. I quote from a letter just received in answer to a question about this plant; "The authority on the *Brittonia Davisii* is that the same flower and characteristics that are found in *Ferocactus uncinatus* are identical in this species and so a new genus has been made by Dr. Houghton that embraces these two plants, since the flower is different from that found in the *Ferocactus* group."

On Watering

By A. Boarder

THE question of watering cacti is a very important one. The often-repeated query "How and when should I water?" is so well known that I make no excuse for this endeavour to help the beginner with this vexing question. The success or failure in cactus culture depends entirely on watering. No matter what potting medium is used, or whether the plants are indoors or in a greenhouse, attention to watering is the deciding factor.

There have been so many directions given at various times that it is not surprising the beginner is confused. Many are of the opinion that little or no water is needed, whereas cacti cannot grow without it. While nothing kills a cactus quicker than over-watering, the same plant cannot live without it, although it is able to withstand long periods of drought. In the first place I must point out that it is impossible to lay down a hard and fast rule, as what is necessary for plants in a sunny greenhouse might easily ruin the same plants if indoors or in a cold greenhouse. If there is one rule that can be adhered to in any case it is—Never water a pot the soil of which is still damp. That should be easy to carry out. So much depends on the warmth of the place where the plants are kept, but if a plant soon dries out, then it can be given another drink if the weather is favourable.

I will deal now with plants that are growing, such as seedlings and well-rooted offshoots. The only way to keep them growing is to water them well. They lose so much moisture in a week's scorching sunshine that it must not only be made up, but extra moisture be given to help them to grow. It is said that the growing period of a cactus is from May to the end of August; I do not agree with this but contend that a cactus will grow all the year round if given a warm temperature and judicious watering. There are many bright spells in December and January when I often water every plant. This is not always with the idea of making them grow, but it prevents them from shrivelling too much and so saving time later, when they can grow on instead of having to fill up tissue first.

If you have plants large enough for your collection you need not water at all during the winter. Now, although I water occasionally in winter, I do not advise any one to do this unless they have some heat that will assist in drying up the superfluous water;

so much depends on your house, but if you keep the golden rule in mind "no water while still damp," you cannot go far wrong. If the greenhouse is in a sunny position you may water once a week in February and then gradually increase water to those that are growing. You can easily tell this by the look of the growing centre. If a plant is not making fresh growth, do not be tempted to overwater it in the hope of encouraging it, as the opposite is needed. The plants can be watered every day in the late spring and summer as long as the weather is fine. No useful purpose is served by watering in dull weather, it is better to leave well alone, even for a week or two. Work with the weather and the temperature of the greenhouse, and watch the plants and only water those that need it. You may find that some pots dry out quicker than others while some hardly ever get dry at all. Keep a close watch for the latter and put them on one side for re-potting. If you water in the winter, be sure that you have a window open to admit fresh air and assist in drying up any surplus moisture.

The next point is how to water. If you have plenty of time, stand the pots in rain water nearly up to the rims until the whole soil is saturated. This method is impossible for those with limited time and numerous pots. Personally, I always water from above with a small Haw's can, letting the water run gently over the soil. Do not use too large a can as, besides being tiring, the weight of water in the can forces the jet out too fast and may wash away the soil. Do not pour water over the plants, especially *Mammillarias* and *Echinocacti*. If the pots are very dry it may be necessary to go over them again. You cannot overwater a plant that has been potted correctly, provided that you do not water again until dry. When potting, always leave sufficient space at the top to water well, otherwise it trickles over the side and the plant is starved. I have seen many plants in collections which the owners state do not grow, and I have been ready to wager that the centre of the ball of soil has not been really wet for many weeks, even in summer weather when a plant must have moisture to grow. Do not water newly potted plants too much until fresh growth is apparent; this depends a great deal on the weather.

The time to decrease watering depends again on the weather. You may continue ordinary watering right through September

as a rule and then give it once a week through October. After that, you need not water again until February unless you have a warm spell and the temperature of your house is not too low. Only small seedlings need watering regularly through the winter to keep them growing. Always use rain water that has been standing in the house. In summer, water at night, and in the winter, in the morning. In the hot weather the night watering gives the plant a chance to absorb moisture before the sun gets up to dry it up. In cooler weather, night watering would only tend to cool the plants too much, also one can see better in the morning whether the soil in a pot is dry or not. Often at night after a hot day the surface looks dry but it may be very damp underneath, whereas in the morning the soil would be of uniform dampness.

During the spring and summer, plants may be sprayed in the evenings but only in bright weather; this has a beneficial effect on the plants and is a deterrent to insect pests. Time spent in careful watering is never wasted, as success is impossible without it.

R.H.S. Amateurs' Flower Show

Members are reminded that the Amateurs' Flower Show of the Royal Horticultural Society will be held on Tuesday, June 19th, 1934. Amongst the many classes are three devoted to Cacti and Succulents: one for a group of cacti and/or succulents on a table space with a frontage of 6 ft. and a depth of 3 ft., open to all amateurs; one for eight cacti and/or succulents, in pots, eight varieties, open to amateurs who do not regularly employ more paid assistants than one gardener and one boy; and a class for three specimen succulents, in pots, three genera to be represented, open only to those amateurs who do not regularly employ any paid assistant. Entries must be received by June 12th and schedules of this Show may be obtained from the Secretary, R.H.S., Vincent Square, London, S.W.1.

The number of entries for these classes was very low last year, partly no doubt because the Society's own Exhibition was held within a fortnight of the Amateur Show; this year the two shows are five weeks apart and it is hoped that more members will enter for the Royal Horticultural Society's Show, as this is an excellent opportunity of bringing the plants we are interested in before a larger public.

Editorial

THIS number concludes the second volume of the CACTUS JOURNAL, and we hope that we can now claim that this small publication is taking its place amongst cactus literature. We are trying to cover as wide a field as possible and in this endeavour rely on members and friends to contribute any items of interest on which they may come. Those who have already helped in this way know that the Editor very much appreciates their support.

The new season is now well advanced, and many people will be adding to their collections. To some the Latin names are rather a stumbling block, but as there are no English equivalents in most cases, and cannot be since the plants are not native to this country, let us not be led into thinking that coined "common names" are any easier to remember than the botanical ones, which at least have the merit of being accurate. Some American publications, in endeavouring to help the amateur, are lavish in English names; such descriptive names as "Fish-hook Cactus" sound attractive till one finds one cannot remember to which *Ferocactus* it is applied, if indeed it is not applied to several. We were nearly led into thinking that a "Strawberry Cactus" was *Echinocereus stramineus*, since *stramineus* is the Latin for straw, till we found that the plant referred to was a species of *Mammillaria*, so called on account of the taste of its fruits. By the way, do many members in this country taste their cactus fruits? We believe none are poisonous (though we should hesitate to be too definite) and some are known to be unpalatable. Personally, we are not particularly adventurous in this direction, having a profound distrust of the unknown; and anyway, it is rare in this country to produce enough for a decent dish at dessert.

But reverting to names. There is an old proverb: "What can't be cured must be endured." The best way is not to bother too much; keep the labels that come with the plants and read them occasionally as you go round and it is surprising how soon they will become familiar. Individuals may please themselves; there are people who pull out the labels at once because they spoil the look of the plants. But most people are anxious to know the correct names and, as a Society, we should do what we can to help rather than hinder the difficult business of accurate nomenclature.

The Flowering of Cacti

THE subject under discussion at the meeting held on March 20th was the flowering of cacti; Mr. Boarder opened the discussion by saying that what every grower wanted was to produce flowers, but so much depended on the conditions under which the plants were grown. Cacti vary also, some being easier to flower than others, whilst certain kinds need to be years old before they will produce flowers. The night-flowering *Cereus* only blooms after it has become a good-sized plant, but *Cereus flagelliformis*, the Rat Tail Cactus, flowers easily; if any difficulty is experienced with this species the treatment is probably too hot. *Mammillarias*, on the whole, are very free flowering, also *Echinopses*, which flower every year once they have reached the flowering size. Amongst the *Echinocacti*, the genera *Malacocarpus* and *Gymnocalycium* produce flowers freely, *Malacocarpus Ottonis* being an especially easy kind. The *Echinocerei* are not so easy and usually the plants need to be well established. *Opuntias* only flower when quite large plants; *Phyllocacti* can be flowered by anyone.

Mr. Boarder said that last year he flowered ninety-six different species of *Mammillaria*, three of the plants being one-year-old seedlings; in fact *M. dioica* produced two flowers as a one-year-old plant from which were formed golden brown berries, the seed from which had already germinated at the time of the meeting. The plant of *M. ocamponis* which was illustrated in the *Journal* (Vol. 2, No. 1) bearing five flowers, was shown at the meeting with a dozen buds already well developed. Mr. Boarder considers that the conditions recommended in many books are too arid and that the plants should be neither starved nor allowed to shrivel; they should have some water during the winter but not enough to induce growth; sun is essential. Mr. Boarder also recommends pollinating the flowers by means of a brush so as to ensure a good crop of berries, which are as decorative as the flowers themselves. A later speaker thought the brush should be sterilised (by dipping into alcohol) before using it on a second plant to prevent casual hybridisation.

The conditions under which Mr. Boarder grows his plants and which are so successful in his hands are chiefly a low winter tem-

perature (his average winter temperature apart from sun heat being 38° F.), all the sun and air possible, and watering from January onwards occasionally, and regularly after March whenever the pots dry out, but not before. From April to July he sprays first thing every morning if the weather is bright, and again at night if the day has been hot.

One speaker said that he had been using electric heating and found the buds dropped off the *Epiphyllums*. Mr. Higgins suggested that this might be due to the air being too dry and that, when installing electric heating, it was advisable to see that the heaters were rated low; it should be possible to touch them with the hand when full on. Mr. Higgins also suggested that the age of the plant was an important factor in producing flowers; the *Mammillarias* mostly mature early, but some species such as *Cereus* (*Lophocereus*) *Schottii* actually produce a different form of branch before they are capable of flowering. A specimen of *Cereus* (*Chamaecereus*) *Silvestrii* had not flowered for the first year or two; last year it produced one flower and this year was already covered with buds, though offsets taken from it two years ago and grown on the same shelf were budless; this looks as if the plant needs to reach a certain state of maturity.

Mr. O'Donoghue said that, botanically, flowers were the result of ripened growth, and quoted as the most successful effort he had had in flowering *Cereus flagelliformis* when a piece 15 inches long was left for eighteen months lying on a china plate; it was then found to have 23 buds, 7 of which opened to perfect flowers, and this had not been "kept growing" as recommended by Mr. Boarder.

Miss Mackenzie asked if the statement sometimes made that plants should be kept pot-bound to induce flowers was correct; the general opinion was that there is no truth in this statement; cacti are more likely to flower if kept in a healthy condition. Mr. Boarder said none of his plants were pot-bound, as he believed in re-potting as soon as necessary.

As is usual with discussion, no definite conclusions were reached on how to make cacti flower, but it is hoped that the interchange of experiences may have suggested to members in difficulties new methods of treatment.

Lophocereus in Lower California

By Howard E. Gates

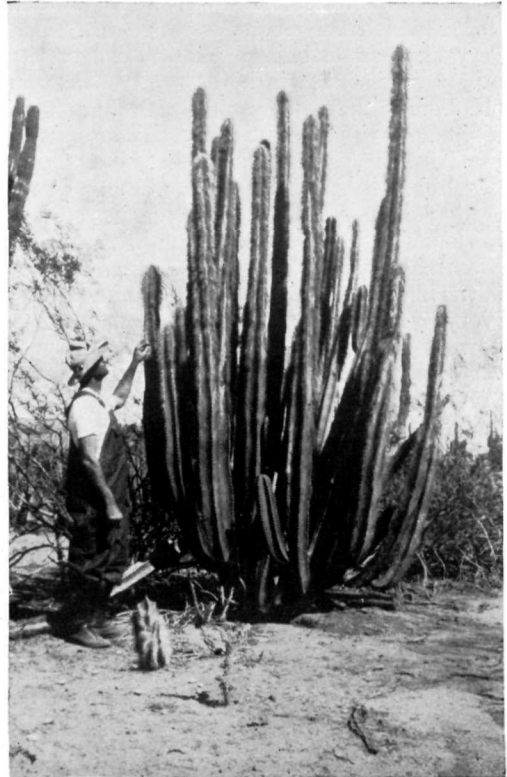
ONE of the most interesting *Cereus* groups of Lower California, Mexico, are the *Lophocereus*. Britton and Rose in their monograph on "The Cactaceae" recognise only *Lophocereus Schottii*, but there are apparently four species and one monstrous type, all of which are native only to Lower California except the *L. Schottii*, which grows also across the Gulf of California in Sonora, and in a few zealously guarded small groups in Arizona.

All the *Lophocereus* have large angular branches which are very peculiar in that the lower three to eight feet have short, stiff, grey spines while the upper portions of the taller branches are hidden beneath a dense covering of longer weak spines, varying in colour from white through brown and grey to black. The night-blooming flowers are borne among these fine spines. The flowers are about an inch and a quarter long, trumpet-shaped and vary from white through pink to almost red with cream or yellow throats. The perianth segments have a glistening sheen as though moulded from wax. Aside from the colour, which is exceptional in a large type of *Cereus*, they are peculiar in that several flowers are borne from an areole, and a branch will carry buds, flowers, green fruit and ripe fruit at the same time. The ripe fruit is naked, globular of about an inch in diameter and brilliant scarlet in colour. In spite of its inviting appearance the fruit is not palatable.

Those who have dissected the hairy tips of these plants have noted that insects lay eggs in the base of the areoles. The larvae of these insects eat out quite a cavity, which the plant lines with a hard layer of corky material which forms a gourd-shaped vessel with the neck as an opening in the base of the areole. It is said that the insect responsible for this queer formation is a moth that is necessary for the pollination of the flowers, and in return the plant supports the larva of the moth.

The whole group of *Lophocereus* prefer the sandy canyon bottoms or the silty plains. Under cultivation they respond readily to rich soil and abundant watering. As they are heavy rooters ample pot room should be given. Cuttings are exceedingly slow to root but are seldom lost through rot. Seedlings grow readily, but, of course, it is many years before the hairy spines develop. However, because of the great difference between these

and the other types of cactus as well as their inherent beauty, juvenile specimens are very pleasing things to possess. It is likely that *Lophocereus Schottii* will prove hardy in the milder sections of England.

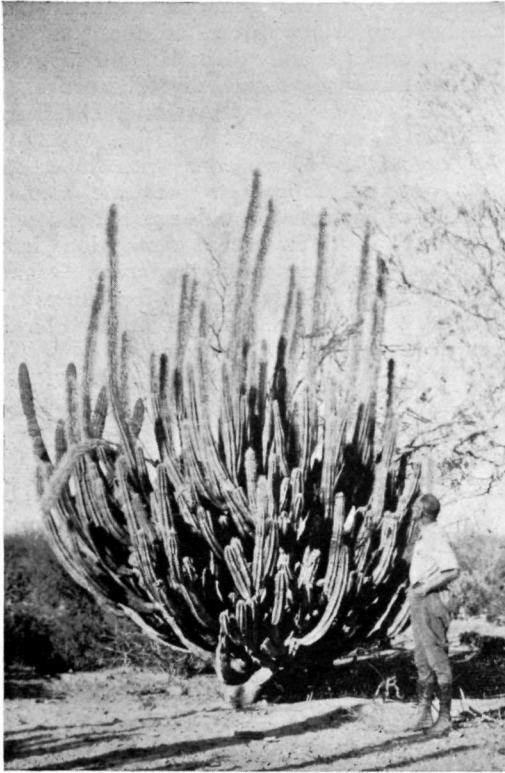


The Author beside Lophocereus Schottii.

The species first encountered as one journeys down the finger of land that forms Lower California is *Schottii*. This species has the heaviest branches of all with the smallest average of ribs. The diameter of the branches may reach eight inches, while the ribs number from four to seven. The branches curve out from the base of the plant until they clear the older branches and then are perfectly erect. Good specimens will have twenty-five or more branches, some of them reaching a height of sixteen feet.

Lophocereus sargentianus appears in the mountainous central portion of the peninsula in latitude 26. Its habits are very similar to that of *Schottii* except the branches are more numerous and slender.

In the tip of the peninsula, in the borders of the Torrid Zone, is the *Lophocereus australis*. In contrast to all the other forms which only branch at the ground, this species forms a definite short trunk from which the branches arise. The plants will attain a height of twenty-five feet with literally hundreds of branches. The branches carry from six to ten ribs and are the slenderest of all.



Lophocereus australis.

In the spring of 1933 in a few canyon bottoms I discovered a new species. For the time being I do not wish to reveal its exact habitat as it appears to be the rarest of all the normal forms. It is likely that this species will be named *Gatesii*, for such honours are the reward of the plant explorer. He is never known to get rich in gold. The branches of *L. Gatesii* curve outward more than the other forms and they do not appear to exceed ten feet in height. The ten to fifteen ribs are so closely spaced the branches appear cylindrical instead of angular. The juvenile branches are armed with closely-set clusters of short, sharp spines. The adult tips are so densely covered with interlocking hairy spines that they look like fox tails. The burnt coral

coloured flowers have sharply recurved perianth segments.

There has never been a crested plant in all the thousands of *Lophocereus* I have seen. However, in one of the driest parts of the peninsula, in an area possibly a half-mile wide and three times as long, is a colony of peculiar monstrous plants. I understand that these are known to some of my readers as "Epstein," while the American public with one accord named them "Totem Poles." The ribs and spines of this have disappeared and in their place are peculiar smooth-skinned green knobs and bumps that might have been carved out of green soap. Many of the old branches are cracked lengthwise, probably because their irregular growth made it impossible for them to expand like the ribbed forms when turgid with heavy rains. The juvenile branches are absolutely spineless but the tips of the branches corresponding to the hairy tips of the regular forms bear a few areoles and an occasional weak spine. The freakish areoles are often much elongated and sometimes nearly encircle a branch. A few flowers, very similar to the normal form, are borne, but apparently they are sterile, as the fruit has never been observed. There is a great mystery in that though there are several hundred of these monstrous specimens in the group, none has ever been found bearing both regular and monstrous branches, as is usually the case with monstrosities. My personal theory is that for some reason there developed a freak ancestor and in spite of our fruitless observations they must occasionally bear fruit. In the colony, representatives of the monstrous and normal forms are approximately balanced in number.

NOTE.—In the *Cactus and Succulent Journal of America*, Vol. V, No. 10, April 1934, the new *Lophocereus* referred to on this page is fully described by Marcus E. Jones and it has been called *Lophocereus Gatesii*, after its discoverer. An illustration accompanies the description.—ED.

Mr. R. H. Keeler, 93, King's Drive, Bishopston, Bristol, has sent photographs of a collection of cacti started by his grandfather more than fifty years ago; after some years of neglect this collection is again being built up, several of the original specimens being still in existence. The names of some of the species have been lost, and if any member is in Bristol, Mr. Keeler would be glad of help in re-naming them.

Lithops Edithae, N.E.Br.

Growths about an inch high and the same in breadth, 8-9 lines thick, obconic, flat (not at all convex) on the top, with the transverse fissure 2-3 lines deep; surface glabrous, violaceous grey on the sides and dove-grey with a faint rosy tint on the top, where it is marked with distinctly impressed chocolate-coloured markings forming an irregular pattern. Flowers unknown.

Locality unknown, but possibly Great Namaqualand.

This is a very distinct species, allied to *L.bella*, N.E.Br., but distinguished from that and all others known to me by its flat top and pretty dove-grey colour. I have no knowledge of its origin.

Sphalmanthus Herberti, N.E.Br.

Rootstock an ovoid or ellipsoid tuber, branching into or giving off roots, fleshy, smooth, light brown. Stems usually only one or two to a plant, but sometimes branching, apparently more or less dying away in the dry season, about $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long in the wild state, but longer under cultivation, $1-1\frac{1}{2}$ line thick, terete, branching at the upper part in an irregular and compact manner, with the divisions 2-7 lines long, and together with the leaves and calyx glabrous and covered with glittering papulae elongated in the longer direction of the organ. Leaves opposite, spreading, united at the base, 5-9 lines long, $1\frac{1}{2}$ -3 lines broad, and $1-1\frac{1}{2}$ line thick, mostly oblong-linear, with some ovate-oblong, obtuse, channelled down the face, rounded on the back, glabrous, papulose, green or ruby-tinted. Flowers about 3-7 to a branch, sessile or subsessile in an irregular, leafy, compact cyme. Calyx subequally 5-lobed down to the ovary, covered with rather larger papulae than those on the stem, with the ovary-part subglobose pear-shaped, $3\frac{1}{2}$ - $4\frac{1}{2}$ lines in diameter; lobes $2\frac{1}{2}$ -3 lines long, $1\frac{3}{4}$ -2 lines broad, deltoid or ovate, with a dorsal point, obtuse. Corolla about $\frac{3}{4}$ inch in diameter, fragrant; petals numerous, in several series, united at the base into a short tube about 1 line long; the outer about $3\frac{1}{2}$ lines long and $\frac{1}{3}-\frac{1}{2}$ line broad, cuneately linear, obtuse, pale lemon-buff; the inner or staminodes apparently in a mass or connivent (only withered flowers seen), about $2\frac{1}{2}$ lines long, very narrowly filiform-linear, acute or obtuse, some with barren anthers, "they completely hide the stamens and are darker in colour than the outer petals," according to Dr. Maughan

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Brown. Stamens numerous, in about 3 series, erect, the longer about $1-1\frac{1}{4}$ line long; filaments white, anthers pale or creamy yellow. Glands forming a ring. Stigmas 5, minute, about $\frac{1}{2}$ line long, stout, deltoid or lanceolate, acute, at first erect and forming a cone, finally spreading. Ovary partly superior, flattish convex on top, 5-celled, placentas axile. Capsule not seen, but immature seeds are about $\frac{3}{4}$ line in diameter, compressed and D-shaped, with both edges surrounded by a membranous wing formed of one layer of elongated cells radially disposed, and the rest of the surface microscopically tuberculate.

South Africa: Van Rhynsdorp Division, *Maughan Brown*.

Sphalmanthus is a genus with tuberous roots and decumbent or prostrate stems, which in some species would seem to die down annually. Very few are in cultivation, but those that are seem to flower freely. I am indebted to its discoverer for a few tubers of this species, whose seeds are unlike any I have seen in any genus of Mesemb.

N. E. BROWN.

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Phyllocactus and Epiphyllum

IT would probably surprise growers of an older generation to find that seven numbers of a cactus journal could be issued in this country with little or no mention of either Phyllocacti or Epiphyllums; they were cultivated much more extensively at one time, and Lewis Castle, in his book *Cactaceous Plants*, published in 1884, wrote: "The two most valuable genera in the whole cactus family, considered from a horticulturalist's standpoint, are undoubtedly the Phyllocactus and the Epiphyllum, and they are the only two which can be said to have partially escaped the modern neglect of the Cactaceae as garden plants." But even to-day, there are very few collections of cacti which do not include one or two Phyllocacti, but for various reasons—lack of space or of interest—they are too often herded in with the desert types, now much more popular, and under these dry conditions do not grow as well as they might. But there are still many growers anxious to do justice to these plants, so that a few words as to their cultural requirements may not come amiss.

Both Phyllocacti and Epiphyllums are distinguished by having their stems flattened and more or less leaf-like (hence the names, Phyllocactus = leaf-cactus, Epiphyllum = upon the leaf), the flowers being borne on the edges in the case of the former and on the tips of the branches in Epiphyllum. For the sake of those who are interested in Britton and Rose's classification, it may be mentioned that they have reverted to the earlier name for Phyllocactus, which is Epiphyllum. This is in conformity with the rules of nomenclature, but is unfortunate in this case, since the name which has priority is in common use for another well-known genus. Under the American system then, Phyllocactus becomes Epiphyllum, *Phyllocactus phyllanthus* Link being taken as the type plant, whilst *Epiphyllum truncatum* Haworth becomes *Zygocactus truncatus* and *Epiphyllum Russellianum* becomes *Schlumbergera Russellianum*. Other species of the original genus Phyllocactus have been separated off by Drs. Britton and Rose so that *Phyllocactus biformis* Labouret is the type plant of the genus Disocactus, *Phyllocactus Nelsonii* Vaupel that of Chiapasia, *Phyllocactus Bradei* Vaupel that of Eccremocactus, and *Phyllocactus Phyllanthoides* Link that of Nopalxochia. This differentiation is only of interest to the botanically-minded, especially as the majority of the "Phyllocacti" now commonly in cultivation are hybrids and not pure species.

There are about two dozen true species, which, with the Epiphyllums, come from the tropical parts of America, Brazil, Paraguay, etc., where they grow as epiphytes in the forests. Owing to their position they have to depend for their water supply on atmospheric moisture and on showers, but though the stems are somewhat succulent, they are not adapted to resist extreme drought or scorching sun. The spines are poorly developed as a rule, but aerial roots are produced freely. As the structure of the flower indicates they are closely related to the Cerei; in fact, in the seedling stage they are sometimes difficult to distinguish. This relationship is further emphasised by the ease with which hybrids can be obtained between the two genera. The hybridisation in many cases is now difficult to follow but some of the earlier forms were obtained by crossing *Phyllocactus phyllanthoides*, *Ph. Ackermannii* and *Ph. crenatus* with *Cereus grandiflorus* and *C. nycticalis*, to increase the size of the flower, and with *Cereus speciosus* to improve the colour. Some of the resulting crosses produced seed, whilst others proved sterile. It is almost impossible to-day to name a Phyllocactus from the stem alone, though when it flowers some indication of its origin may be obtained. The Epiphyllums have also been hybridised but not to anything like the same extent as the Phyllocacti.

Cultivation.—It will be obvious that plants from moist regions and tropical forests require very different treatment from those found amongst desert surroundings; a drier period is beneficial to ripen the stems, but during the growing season they require a considerable amount of water and a fairly rich soil. Since they are epiphytes and usually hang from the branches of trees, they could probably be grown in baskets under similar conditions to the epiphytic orchids; it is, however, more usual to grow them in pots. In the case of Epiphyllums, though these grow easily on their own roots, they are very often grafted, the stock generally used being *Peireskia aculeata*. If carefully done so that the union is not unsightly this has the advantage of raising the pendent branches above the soil level and the flowers can be seen better. It is best to let the branches assume their natural position rather than to train them out stiffly—they can be tied to a frame work so that they form a sort of Catherine Wheel—as then the flowers hang more gracefully.

The soil used for potting both Phyllocacti and Epiphyllums should be made very

porous by the addition of sand and broken brick, for otherwise there is a tendency for the stems to rot off at the base. A good turfy loam should be used, with a generous mixture of leaf-mould or peat. It is a common practice with these cacti to add well-rotted manure; in the case of the hybrids, where the object is to produce flowers as large and as richly coloured as possible, this is undoubtedly advantageous. If true species are to be grown, they will probably be forced out of character and grow too lush if given artificial feeding.

Under liberal treatment Phyllocacti make large plants with a group of stems up to a yard long or more and will bear a large number of flowers. The plants do better in an ordinary greenhouse where the air is moist than in a cactus house, and should, when growing, be given some shade from the full sun. The flowering period is about April and May, and after this the plants make their chief growth. Repotting is not required annually, about every three years is generally often enough unless the plants have become root-bound. Large old specimens are sometimes left for longer periods with occasional top-dressing and artificial feeding. After flowering is the best time to repot the plants, which should be kept in moist conditions, partially shaded until about August, when growth will probably be complete. They may then be put out of doors in full sun to ripen off the stems and given less water; if shrivelling occurs it will do no harm at this stage. They must be brought back into a greenhouse before frost occurs and only enough water is needed during the winter to keep the stems firm without shrivelling; as soon as buds appear more water may be given. The minimum temperature during winter should not be lower than 50° F., probably 55° F. is better, if it can be maintained.

The long branches do not easily support themselves and should be tied in carefully as they grow. Old branches which have produced many flowers may shrivel, in which case they should be cut out.

Propagation.—The true species may be raised from seed, though this is not often resorted to; but the hybrids can only be propagated from cuttings. Any suitable branch may be cut off at the desired length; it should be laid aside for a day or two so that the cut surface may dry and then be inserted in moist sand, or sand and peat, in a box which can be covered with a pane of glass, or in a frame, if one is available. Roots are rapidly produced, especially if the tem-

perature can be kept up to 60° F. It is not either necessary or desirable to insert the cuttings very deeply into the sand; on the other hand, if laid on the sand they may produce roots up the stem where they are not wanted. For long cuttings which will not stand erect by themselves it is a good plan to tie them to a stick which projects below the cut edge and can then be driven into the sand as a support.

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Cereus Silvestrii cristata.

A New, Large-flowered Cristate

After four years of cultivation and propagation, a new cristate is now available, which is quite different in habit and, in many respects, should be of great interest to the amateur. Every one knows that cristates of *Cereus Silvestrii* have not flowered up to now and were of poor habit, quickly reverting to normal growth. Several years ago there appeared a single plant with the following characteristics. It originated from a piece which was much more robust than the normal *C. Silvestrii*. The stem developed side-shoots which were even stronger and, like the main stem, continued to be crested, some of them in most grotesque shapes (stag's horn, cross-shaped, etc.). There was also a contrary development, as with most cristates previously known, which by fasciation tend to revert to normal. This shoot which grew better than the normal, further proved itself capable of growing on its own roots and was proof against red spider.

But the most important characteristic is that the plant is so free-flowering. The crested shapes are covered in spring with a whole crowd of buds. The flowers are of darker colour than in the usual plants; more perianth leaves are produced than in normal flowers, in fact there are plants which have no stamens at all, so that they are almost entirely double.

Since there are hardly any flowering cristates with the exception of *Rebutia minuscula* and *Mammillaria Wildiana*, and since the large flowers of this new cristate surpass in size and beauty even the flowers of *Rebutia minuscula crist.*, it is not too much to say that the new *C. Silvestrii f. crassicaulis cristata* is one of the most valuable cactus productions of the last year, whether for beginners or experienced growers.

C. BACKEBERG.

Photographs

The Society has received from time to time interesting photographs of cacti and other succulent plants. It is proposed that these should be mounted so as to make them more readily available for consultation. If any members have photographs that they care to contribute, the Hon. Secretary would be very glad to receive them; as full details as possible should be given, such as name of plant (if known), whether imported or seedlings, habitat, etc. Whenever possible photographs should be sent unmounted. Good illustrations, coloured or otherwise, would also be useful, if members have spare copies for disposal. It is hoped ultimately that as large a number as possible of the known species of cacti and succulents will be represented, so that the collection may form a valuable work of reference.

Succulents

Other than Cactaceae and Mesembryanthemae

By R. S. Farden

(Continued from page 58)

Genus F 31. *Lenophyllum*.

The flowers are yellow, solitary or in small one-sided racemes. The plants have fleshy opposite leaves, arranged in a rosette and resembling *Echeverias* or *Crassulas*. *Habitat* Mexico and Texas.

Two of the 5 species are in cultivation :—
L. pusillum. *L. acutifolium*.

Genus F 32. *Echeveria*.

Berger divides this genus into seven sub-sections :—

F 32 -1. *Oliveranthus*. *F* 32 -5. *Styllophyllum*.
F 32 -2. *Euecheveria*. *F* 32 -6. *Courantia*.
F 32 -3. *Urbinia*. *F* 32 -7. *Thompsonella*.
F 32 -4 *Dudleya*.

The flowers are always borne on lateral leafy racemes. The plants are succulent, with or without stems; the leaves are spirally arranged in close or loose rosettes, fleshy, of various shapes, often mealy, sometimes reddish; the edges are never toothed. *Habitat* from Texas to California and in South America in the mountainous regions.

F 32 -1. *Oliveranthus*.

The flowers are large and red; the plants shrubby and much branched with fleshy leaves at the tips of the branches. There is one species which is in cultivation :—

E. elegans.

F 32 -2. *Euecheveria*.

This sub-section which contains most of the true *Echeverias* is divided into 5 sub-sections :—

F 32 -2 -1. *Spicatae*. *F* 32 -2 -4. *Gibbiflorae*.
F 32 -2 -2. *Racemosae*. *F* 32 -2 -5. *Paniculatae*.
F 32 -2 -3. *Secundae*.

Spicatae.

There are 7 species, those in cultivation being :—

E. mucronata. *E. leucotricha*.
E. pubescens. *E. coccinea*.

Racemosae.

There are 25 species, the following being in cultivation :—

E. guatemalensis. *E. canaliculata*.
E. pulvinata. *E. Pringlei*.
E. multicaulis. *E. racemosa*.
E. nodulosa. *E. atropurpurea*.
E. perbella.

Page Seventy-four

Secundae.

There are 21 species those in cultivation being :—

E. Derenbergii. *E. glauca*.
E. cuspidata. *E. Peacockii*.
E. turgida. *E. secunda*.
E. pumila. *E. perelegans*.

Gibbiflorae.

There are 18 species but the only one in cultivation is *E. gibbiflora* and its varieties *metallica*, *crispata*, *carunculata*, etc.

Paniculatae.

Two of the 4 species are in cultivation :—
E. pulchella. *E. microcalyx*.

F 32 -3 *Urbinia*.

Of the 5 species three are in cultivation :—
E. agavoides. *E. Corderoyi*.
E. setosa.

F 32 -4 *Dudleya*.

This section, nearly all from California, is named after W. R. Dudley, Prof. of Systematic Botany, Stamford University, U.S.A. Britton and Rose raised this sub-family into a genus in 1903; Alwin Berger nevertheless retains them in the *Echeverias*. It does not matter very much to collectors which way it is. Mr. Howard E. Gates made two journeys down the Californian peninsula in 1931-32 and brought back some 50 forms of which a high proportion turned out to be new species.

There are about 80 species, those best known in cultivation are :—

E. pulverulenta. *E. farinosa*.
E. Greenii. *E. Brittonii*.
E. caespitosa. *E. cymosa*.
E. cotyledon.

F 32 -5. *Styllophyllum*.

There are 12 species, one of which is in cultivation :—

E. edulis.

F 32 -6. *Courantia*.

The only species is not in cultivation.

F 32 -7. *Thompsonella*.

Neither of the two species are in cultivation.

Genus F 33. *Pachyphytum*.

The flowers are borne in simple or branched inflorescences, nodding at first. The plants have thick, much-branched stems, the leaves are in loose elongated rosette, fleshy and more or less cylindrical. *Habitat* Mexico. Some of the garden hybrids resemble *Echeverias*.

There are 8 species, with many hybrids and garden forms; the following are in cultivation:—

- | | |
|----------------|-----------------|
| P. bracteosum. | P. brevifolium. |
| P. compactum. | P. uniflorum. |
| P. oviferum. | P. Hookeri. |

End of the Crassulaceae.

ALOES

(Family Liliaceae)

The name comes from Alloeh, the Arabic name for the plants. *Soil.* Nicholson says they thrive well in a mixture of open loam and peat and a small quantity of well decomposed manure, with broken brick or burnt clay to assure perfect drainage; they cannot have too much sun at any time. Water, especially in winter, must be given carefully.

Aloes are natives of Cape Colony, except where otherwise stated in the following list. These notes are from the section of *Das Pflanzenreich* on Liliaceae-Asphodeloideae-Aloineae, contributed by Alwin Berger. In this book the descriptions are in Latin, which renders it difficult for me to follow thoroughly.

The ALIONEAE are divided into two sub-tribes:—

- I. KNIPHOFIINAE.
- II. ALOINAE.

the former contains two genera:—

- A. Kniphofia
- B. Notosceptrum

and the ALOINAE are divided into seven genera:—

- C. Chortolirion
- D. Haworthia
- E. Apicra
- F. Chamaealoe
- G. Gasteria
- H. Aloe
- I. Lomatophyllum

Some of these are divided into sections and they are interspersed with hybrids as well.

N.B.—Berger puts the above in their evolutionary order, but that is rather confusing, as in these lists we should have half the Aloes first, then Haworthias, Apicras and Gasterias and then the other half of the Aloes; so I have put all the Aloes together and then made the Haworthias, etc., follow on.

I give below the full list of species as given by Berger; the descriptions are from other sources and serve to show the type of plant in the various sections.

Genus A. Kniphofia.

Named after Professor Kniphof, of the University of Erfurt; the species are divided into three sections and one of these is subdivided into 14 sub-sections. None of these seem interesting to collectors of succulents, so I propose to leave out any further details of them.

Genus B. Notosceptrum.

There are five species in this genus:—

- N. natalense, leaves rigid, lanceolate, 1-1½ ft. long, 1 inch broad at the middle, narrowed gradually to base and apex, with serrulated margin. Peduncle stout, as long as the leaves. Natal.
- N. aloides, leaves several, strap-shaped, 2 ft. long, turning outward; peduncle 2-3 ft. tall, flowers in a dense cylindrical spike. Kahari, Transvaal.
- N. andongensis. New Guinea.
- N. Benguellense.
- N. brachystachyum, Griqualand West.

Genus C. Chortolirion.

There are four species:—

- C. stenophyllum, Transvaal.
- C. tenuifolium, Bechuanaland.
- C. angolense, Angola.
- C. subspicatum, Transvaal.

Genus H. Aloe.

This genus is native of S. Africa and all up the East coast to Abyssinia and one is found in the N.W. Provinces of India. The genus is divided into 8 sections:—

- | | |
|---------------------|--------------------|
| H. A. Aloinella. | H. E. Dracoaloe. |
| H. B. Leptoaloe. | H. F. Aloidendron. |
| H. C. Eualoe. | H. G. Sabaealoe. |
| H. D. Pachydendron. | H. H. Kumara. |

H. A. ALOINELLA.

- A. Haworthioides, C. Madagascar.

H. B. LEPTOALOE.

- A. myriacantha, stemless. Leaves in many rows, linear, 6 in. long, ¼-⅓ in. wide, dull green, thin, mottled with small white spots; margins minutely toothed. Albany Div., Cape.
- A. Ecklonis, short stem; leaves densely rosulate, sword-like, 1 ft. long, 1½-1¾ in. wide low down, narrowing to the apex, glaucous green, unspotted, margined with close, small, horny, whitish teeth. Transvaal. Syn. A. claviflora.

- A. micracantha, short stem; leaves 15-20, dense, linear-lanceolate, thin, narrowing to a sharp point, 1-1½ ft. long, ¾-1 in. wide, green, copiously spotted with white, margined with minute teeth. Port Elizabeth.
- A. minima, leaves about 12 in. in a stemless rosette, narrowly linear, deeply channelled down the face, 5-6 in. long, spotted with white, margins armed with abundant, minute, spreading white teeth. Natal.
- A. Cooperi, stemless, leaves 8-10 in. in two opposite directions, linear, much dilated at the base, 1½-2 ft. long, 1 in. wide at the base, tapering to the apex, thin, dull green, spotted with white and obscurely striped; margin narrow, white horny, with minute deltoid teeth. Port Elizabeth.
- A. Kraussii, stemless, leaves 6-8, almost in two opposite directions, 2-3 ft. long, ½-1 in. wide, thin, much spotted in the lower part, margin distantly and obscurely toothed. Occurs in many parts of S. Africa.
- A. Kraussii, var. minor, plant only 4-5 in. tall.
- A. Boylei, stemless, leaves thin, lanceolate, 1 ft. long, 1 in. wide low down, tapering to a long point; marginal teeth close, spreading, small deltoid, white. Kalahari Desert, Barberton, etc.
- A. Kniphofioides, stemless, leaves linear, 1-1½ ft. long, ⅛-⅙ in. wide, hardly fleshy, margined with minute, deltoid spines. Pondoland.
- A. parviflora. S.E. Africa.
- A. grammifolia. E. Africa.
- A. Buchananii. Nyassaland.
- A. Nuttii. E. Africa.
- A. brunneopunctata. C. Africa.
- A. chortoliriodes. Transvaal.
- A. carcina.
- A. Johnstonii.
- A. Marchallii. Natal.

H. C. EUALOE.

This section is divided into 5 subsections:—

- H. C. 1 Parvae. H. C. 3 Grandes.
- H. C. 2 Humiles. H. C. 4 Prolongatae.
- H. C. 5 Magnae.

H. C. 1 Parvae.

This subsection is divided into three:—

- H. C. 1. a *Haemanthifoliae*.
with one species, *A. haemanthifolia*.
- H. C. 1. b *Longistyla*.

- A. longistyla, stemless, leaves about 30 in. in a dense rosette, lanceolate, ascending, unspotted, green, 4-6 in. long, 1 in. broad at base tapering to a pungent, horny apex,

margined with pale brown horny, deltoid prickles, ⅓ in. long, many of which extend to the back and a few also to the face. Karroo.

- A. Peglerae. Transvaal.

H. C. 1. c *Aristatae*.

- A. aristata, stemless rosette, 3-4 in. in diameter, leaves 50-60, very dense, multifarious, ascending, lanceolate, 3-4 in. long, ½ in. wide, narrowing gradually into a long soft awn; teeth deltoid, horny, white, ⅙ in. long on the margin and also on the keel of the upper half.
- A. aristata, var. leiphylla, leaves thinner, smaller, teeth smaller and almost confined to the margin.
- A. aristata, var. parvifolia, leaves greyish green, 1½-2 in. long, ⅓ in. wide, as thin as in leiphylla but with a shorter soft awn; the small deltoid teeth on the margin forming two rows on the back. Graaf Reinet.

The following hybrids of *A. aristata* with various *Gasterias* are called *Gastroleas*. Where they have personal names, they are most likely the names of the hybridiser:—

- A. aristata hybrida Beguinii.
- ” ” perfector.
- ” ” precumbens.
- ” ” Chludowii.
- ” ” Lapaixii.
- ” ” Nowatnyi.
- ” ” Bedinghaussii.
- ” ” Simoniana.

H. C. 2. *Humiles*

This subsection is divided into eight:—

H. C. 2 a *Virentes*.

- A. virens, almost stemless, leaves 30-40 in a dense rosette, lanceolate, tapering, 6 in. long, 1 in. wide at base, margined with pale, horny, deltoid prickles ⅓ in. long; back minutely tubercled, green. S. Africa.
- A. virens, var. macilentia, leaves smaller and thinner, tinged with purple.

H. C. 2 b *Echinatae*.

- A. humilis, exceedingly variable, stemless; leaves 30-40 in a dense rosette, ascending, ovate-lanceolate, 3-4 in. long, glaucous green, unspotted, slightly tubercled on the face, margined with copious deltoid white prickles. The back has copious irregular, white, horny tubercles and a few prickles. Grahamstown, etc. Syn. *A. tuberculata*.
- A. humilis, var. incurva, larger, glaucous green, tip incurved.
- A. humilis, var. echinata, leaves smaller than the type with distinct prickles, not tubercles, on the face.

A. humilis, var. *suberecta*, the largest form with leaves 6-7 in. long.

A. humilis, var. *acuminata*, glaucous, margined with prickles, larger.

A. humilis, var. *subtuberculata*, smaller than *acuminata*, with smaller closer prickles.

H. C. 2 c *Prolifera*.

A. brevifolia, old plants with a stem a few inches long; leaves 30-40 forming a dense rosette, lanceolate, 3-4 in. long, 1 in. wide at the base, narrowing to the apex, very glaucous, without spots or lines, margined with white, horny prickles which extend to the keel of the upper part of the back.

A. brevifolia, var. *postgenita*, more robust, with leaves 4-5 in. long.

A. brevifolia, var. *depressa*, more robust, leaves 6 in. long, less glaucous, sometimes with a few prickles extending to the upper surface.

H. C. 2 d *Madagascariensis*

A. deltoideodonta, C. Madagascar.

H. C. 2 e *Rhodacantha*.

A. pratensis, stemless; leaves 60-80, ovate-lanceolate in a dense rosette, 4-6 in. long, glaucous when young, only margined with copious brown, horny teeth; back smooth or slightly prickly. Basutoland.

A. glauca, leaves 30-40 in a dense rosette, 6-8 in. long, 1½-2 in. wide at base, narrowing to the apex, intensely glaucous, spotless, obscurely lined; back tubercled at apex, teeth brownish. Stem eventually 1 ft. high.

H. C. 2 f *Serrulata*.

A. variegata, stemless, leaves spirally trifarious, 6-9 in. long, 4-5 in. wide, dense, erect and spreading, hollowed out, i.e., concave on the face, bright green, with irregular cross bands of confluent oblong whitish spots. Karroo.

A. serrulata, mature plants have a stem 1-2 ft. long. Leaves 12-20 in a dense rosette, oblong, lanceolate, 6-9 in. long, pale green with indistinct lines and copious, obscurely oblong, whitish spots in lines. Margins with minute deltoid, confluent, white, horny prickles.

H. C. 2 g *Saponaria*.

A. saponaria, mature plants ½-1 ft. high, 2-3 in. diameter below the rosette; leaves 12-20, lanceolate or oblong-lanceolate, ½-1 ft. long, green or tinged with purple, indistinctly lined with copious white spots, margins with deltoid, horny, reddish brown prickles.

Fifty-four varieties are given.

H. C. 2 h *Asperifolia*.

A. melanacantha.

A. falcata, habit unknown; leaves much curved, 8-12 in. long, tapering to a brown horny apex, unspotted, margins with brown horny prickles. Calvinia Div., Cape.

A. asperifolia, S.W. Africa.

A. Schlechteri, S. W. Africa.

H. C. 3 *Grandes*.

This subsection is divided into six:—

H. C. 3 a *Percrassae*.

A. percrassa. Abyssinia.

A. rubrolutea. S.W. Africa.

A. litoralis. Angola.

H. C. 3 b *Verae*.

A. desertii.

A. metallica.

A. otallensii. Somaliland.

A. mitis. Somaliland.

A. vacillans. S. Arabia.

A. vera. Cape Verde Isles.

A. vera, var. *officinalis*.

A. vera, var. *chinensis*. India.

A. vera, var. *Lauzae*.

A. Harmsii. S.W. Africa.

A. puberula. Eritrea.

A. trichosantha. Eritrea.

A. tomentosa. S. Arabia.

A. menachensis. S. Arabia.

H. C. 3 c *Latebrachteatae*.

A. cryptopoda.

A. lastii. Zanzibar.

A. brachystachys. Zanzibar.

H. C. 3 d *Tropicales*.

A. abyssinica, leaves about 20 in a rosette, sword-like, 1½-2 ft. green, sometimes spotted, back rounded, margins with prickles, distant, deltoid; stem 1-2 ft.

A. agavifolia. Tropical Africa.

A. Barteri.

A. somaliensis. Somaliland.

A. venosa. Kimbando.

A. angolensis. Angola.

A. congolensis. Congo.

A. Irothae. E. Africa.

A. paedogona. Angola.

A. Buettneri.

A. crassipes. Nubia.

A. penduliflora. Zanzibar.

A. andongensis. Angola.

H. C. 3 e *Aethiopicae*.

A. aeothiopica. Abyssinia.

A. Chabaudii. Zambesii.

A. rabaiensis. Mombasa.

A. lomatoophylloides.

- A. mayottensis. Comores.
- A. Schweinfurthii.
- A. Perryi. Socotra.
- A. palmiformis.
- A. Eru.
- A. Stuhlmannii. Zanzibar.
- A. Rivae.
- A. Dawei. Uganda.
- A. megalacantha. Somaliland.
- A. pungens. S.W. Africa.
- A. concinnus.
- H. C. 3 f Cernuae.
- A. capitata. Madagascar.

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H. C. 4 *Prolongatae*.

This subsection is divided into five :—

H. C. 4 a *Macrifoliae*.

- A. ciliaris, stem many yards long, freely giving off offshoots, leaves laxly disposed, a foot or more long, obscurely striped with green, flat on the face in lower half, minute teeth on edge, white, larger near base. S.W. Cape.
- A. striatula, stem many yards long, leaves spreading, linear, 6-9 in. long. Somerset Div., Cape.
- A. tenuior, stem many yards long, leaves linear, 6-8 in. long, $\frac{1}{2}$ in. wide near base, green, minute teeth. Albany Div., Cape.
- A. Bakeri. Madagascar.
- A. laxiflora. Port Elizabeth.
- A. laeta. Madagascar.
- A. cascadiensis. S.E. Cape.
- A. commixta. E. Cape Colony.

H. C. 4 b *Monostachyae*.

- A. vituensis. Somaliland.
- A. Monteiroi.
- A. Cameronii. Uganda.
- A. oligophylla. C. Madagascar.
- A. Princeae.
- A. Dorotheae.
- A. concinna. Zanzibar.
- A. squarrosa. Socotra.

H. C. 4 c *Pleurostachyae*.

- A. Pirottae. Somaliland.
- A. divaricata. Madagascar.
- A. Ruspoliana, Somaliland.
- A. secundiflora.
- A. Kirkii. Zanzibar.
- A. Hildebrandtii. Tropical E. Africa.
- A. inermis. S. Arabia.
- A. leucantha.

H. C. 4 d *Fruticosae*.

- A. consobrina, slender elongated stem ; leaves in a rosette, laxly disposed, sword-like,

6-8 in. long, green with many distinct, whitish, round or oblong spots, margins with close red brown prickles.

- A. cinnabarina. Transvaal.
- A. pendens. S. Arabia.
- A. confina.
- A. Bussei. Zanzibar.
- A. macrosyphon. Urandi.

H. C. 4 e *Mitriformis*.

- A. distans, stem simple, elongated sub-erect ; leaves laxly disposed over 1 or 2 ft. of the stem, oval-lanceolate, ascending, 3-4 in. long, dull green with glaucous tinge ; face concave not spotted nor lined, rounded on back, margins with white, horny prickles which extend to the keel, towards the top of the back. Syn. *brevifolia*, *mitraeformis* var. *angustior*.
- A. mitriformis, stem 3-4 ft. long, leaves laxly disposed, 6 in. long, 2-3 in. wide near base, dull green with a glaucous tinge, neither spotted nor distinctly striped, pungent at the tip, margins with pale, horny prickles. There are a number of varieties.
- A. Brownii, stem tall ; leaves in a lax rosette, lanceolate, $1\frac{1}{2}$ ft. long, 3-4 in. wide near base, green, pungently tipped, margins with close, brown-tipped prickles.
- A. nobilis, stem 1 ft., leaves lax, ascending, lanceolate, 1 ft. long, green, without spots or stripes, margins with brown, horny prickles a few of which extend to the back.
- A. parvispina.
- A. sororia.

(To be continued.)

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In a recent letter, Mrs. van der Bijl, the Hon. Secretary of the South African Succulent Society, makes some comments on the germination of seeds that will be of interest to members. She says : "Seeds do not all germinate at once and growers would be well advised to keep their pots for some months. One of our members told me in Cape Town that she has had them come up in eight days, three months and eighteen months all in the same tins ! I had some *Mesembryanthemum* seeds come up six months after sowing, so it is not always the fault of the seeds. In nature they do not all come up with the first rain, for then they would soon be exterminated, as one often sees a lot of seedlings die off again for want of more rain. And yet next time it rains, up come others that have been in the ground all the time."

The Cactus Exhibition

THE second Exhibition of Cacti and Succulents, organised by the Society, will be held at the Royal Horticultural Society's Old Hall on July 24th, 1934, and members are asked to make a special note of this date. The first exhibition held last year was naturally of a somewhat experimental character; nevertheless, it may be considered to have been a success. But this year it is hoped that the show will be even better. Possibly some members were shy of exhibiting and preferred to wait and see the sort of plants other people would bring; it is hoped that this year every one will make a big effort to enter in at least one class, if not in several.

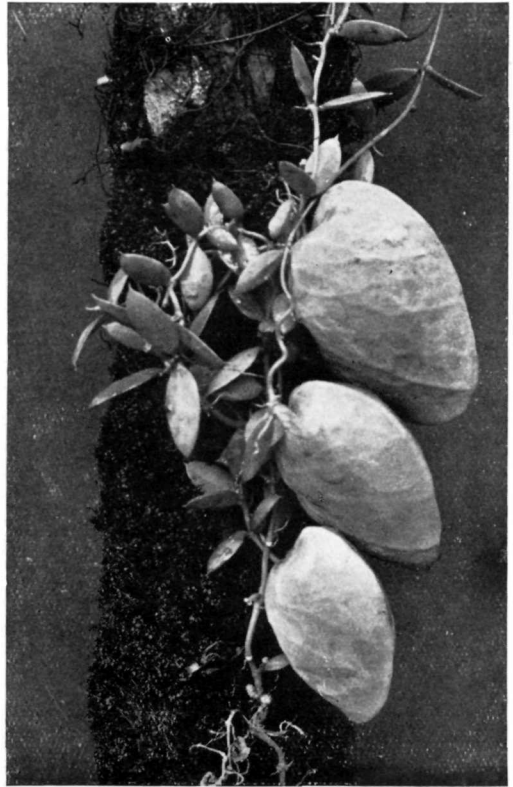
It will be noted that the number and type of plants asked for have been altered somewhat in the light of past experience. There are classes requiring only a few plants, three or six for instance; these have been designed to cater for people with small collections and for those who find transport difficult. The larger classes are intended to tempt owners of large collections to show what can be done in this country in the way of cactus growing. For other succulent plants, similar classes have been planned, catering for the grower who collects all sorts of succulents as well as for those who prefer to specialise.

Junior classes for children under sixteen are an innovation, and it is hoped that members will help to make these widely known; the coming generation should be encouraged in this interesting hobby, and the Society would like to see these junior classes well supported; these two classes are open to non-members.

An exhibition of this nature depends on co-operation; the organisers can and will plan the hall and make all arrangements necessary, but the ultimate success depends on the individual efforts of the members. The schedules have been distributed; further copies can be obtained from the Hon. Secretary; a mislaid schedule should not be made the excuse for not entering plants. The entries should be sent in by July 9th or earlier.

This is an excellent opportunity for those members who are not sufficiently near to attend the London meetings regularly to meet their fellow members; it is hoped that they will make a special point of bringing plants for exhibition and that they will make themselves known to the Officers of the Society, who will be very glad to meet them.

Dischidia Vidallii



Dischidia Vidallii.

In the article on the "Succulents in the Royal Botanic Garden, Edinburgh" (CACTUS JOURNAL, Vol. II, No. 3, p. 52), reference was made to an interesting epiphyte, *Dischidia Vidallii*, which is here illustrated. The Dischidias are members of the family Asclepiadaceae, to which belong also the Ceropegias and Stapelias; they are epiphytes, climbing by adventitious roots, and the leaves are more or less succulent; besides the ordinary leaves, "pitcher leaves" are developed in some species. In *D. Rafflesiana*, for instance, these pitchers have incurved margins and may be as much as 10 cm. deep; they usually contain debris and sometimes water, but as the inner surface has a waxy coating apparently no absorption is possible. Usually a root grows into the pitcher and probably the water is taken up in this way. Various stages of pitcher formation are represented by different species of Dischidia, including *Dischidia Vidallii*, whose bladder-like leaves are clearly shown in the picture.

Book Reviews

“BLAETTER FUER KAKTEENFORSCHUNG,” published by Curt Backeberg, Volksdorf, Bez. Hamburg; issued monthly, price 6s. per annum.

The third and fourth numbers of this Bulletin have now been issued. The third is especially interesting, as it gives a synopsis of the classification adopted; this is based on the natural system of Drs. Britton and Rose and of Alwin Berger. The most important adaptation made by Herr Backeberg is the division of the Tribe Cereae into a northern and a southern section (SECTIO SEPTENTRIONALIS and SECTIO AUSTRALIS). This is of great assistance in dealing with the obvious differences between species from the north and south respectively. Similarly the Echinocactae are sub-divided into Austro-Echinocactae, which includes such genera as Rebutia, Frailea, Malacocarpus and Gynocalycium and Boreo-Echinocactae, which covers the genera Echinocactus (Br. & R.), Astrophytum, Ferocactus and allied northern genera. *Lobivia Higginsiana* Bckbg, n.sp. and *Lobivia Wegheiana* Bckbg, n.sp. are described in this number.

In the fourth issue the characteristics of the genera *Lophocereus*, *Spegazzinia* Bckbg, n.g. (1933) and *Mammillaria* are given, and descriptions with illustrations of *Lophocereus Schottii* Br. R., *Spegazzinia Fidaiana* Bckbg, n.sp., *Mammillaria Blossfeldiana* Boed. and *Mammillaria phitautiana* Werd.

This Bulletin contains most useful information for any one interested in classification; Britton and Rose's Monograph can hardly be regarded as final, especially in view of the many new species discovered since its publication, and the suggestions made by any one who is familiar with the plants in the field cannot but be very helpful towards a complete understanding of the family.

“BLUEHENDE KAKTEEN UND ANDERE SUK-KULENTE PFLANZEN,” by Dr. Erich Werdermann, published by J. Neumann, Neudamm; 6 parts per annum, price R.M. 22.80 per annum.

Parts 17 and 18 of this beautiful publication have now appeared, the high standard of production being well maintained. The former contains *Cephalocereus senilis* Pfeiffer, the illustration showing the plant crowned with beautiful yellow flowers. *Pilocereus polylophus* Salm Dyck is depicted with a large

number of chocolate-coloured buds, two of which have opened to show pale flowers with pink tips to their recurved petals. *Trichocereus huascha* (Weber) Britton and Rose is a large columnar type, branching from the base and inclined to be prostrate, with large orange flowers opening at mid-day. *Trichocereus Spachianus* (Lemaire) Britton and Rose is an erect plant, here shown with a number of large white flowers. All the plants illustrated in this number were photographed in colour by Dr. Werdermann in the Huntingdon Botanic Gardens, California.

In Part 18 are included *Echinocereus De Laetii* Gürke, a beautiful photograph of a group showing the large pink flower, taken in its natural habitat; *Lemaireocereus marginatus* (De Candolle) Werdermann, also photographed in its native site, shows flowers and fruit together and is of particular interest as the plant, though often seen in collections, rarely, if ever, attains flowering size there. A fine flowering specimen of *Escontria chiotilla* (Weber) Rose was photographed in the Huntingdon Botanic Garden; and *Ferocactus pilosus* (Gal.) Werdermann, decorated with its red spines and fruits, was also photographed in its habitat. These excellent colour photographs are accompanied in each case with a full description of the plant, the synonyms and notes on history and cultivation.

Catalogues Received

F. A. Haage, Jun., Erfurt, Germany. Illustrated catalogue of plants and seeds of cacti and succulents.

Robert Blossfeld, Neue Koenigstrasse 94, Potsdam, Germany. Illustrated catalogue of seeds of cacti and succulents.

H. Stern, Strada Wolfano Goethe Nr. 77, San Remo, Italy. Illustrated catalogue of plants of cacti and succulents. This catalogue contains nearly two hundred beautiful illustrations, including several in colour; all the chief genera are represented, often by several species; the photographs are especially good.

Chigusaen Nursery, Teramae, Kanazawa-machi, Kanagawa-ken, Japan. Illustrated catalogue of seeds of cacti and succulents.

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"THE TIMES" (Literary Supplement).—"A working handbook on Cacti is long overdue, for interest in these curious and often beautiful plants has recently revived. . . . Mrs. Higgins' chapter on the management and cultivation of the race will help (the amateur) over many pitfalls, for it is the essence of personal experience, the result of trial and error."

"SOUTH AFRICA" (London).—"Botanists will like the new book on the 'Study of Cacti.' Cacti and succulents, these curious and beautiful plants, repay study, and here is a good working handbook."

"GARDENING ILLUSTRATED."—"Mrs. Higgins has provided a complete conspectus of these plants (i.e. Cacti). The book is a model and inexpensive handbook of a family of plants, and the publishers will be well advised to consider publishing similar books dealing with other families."

"AMATEUR GARDENING."—"It will be welcome news to those who seek an up-to-date work on the subject (of Cacti) to learn that Mrs. Vera Higgins has written a book running to 164 pages, under the title of 'A Study of Cacti,' and it is a good book in subject matter, illustration, and style of production. Classifica-

tion, nomenclature, and geographical distribution occupy a good deal of space. These are matters that will interest the more familiar and experienced growers, whilst the methods of cultivation and descriptions of the varied genera will be of practical service to the novice."

"CACTUS JOURNAL OF AMERICA."—"The Cactus world will welcome this new book and make available in condensed form Britton and Rose *The Cactaceae*. The Cactus and Succulent Society of America endorses this book, since Britton & Rose has been accepted by them, as the most complete work on the classification. Beginners will find it very valuable as an introduction to the 'Study of Cacti.'"

"THE CACTUS JOURNAL" (London).—"This book supplies a very long-felt want, and will be of the greatest assistance to all cactophiles, whether highbrows or those who are just beginning to know the great interest and pleasure that can be got out of collecting cacti and succulents. . . . The compilation is most thorough and valuable, and is the most important work in English, only excepting Britton & Rose's *Monograph on the Cactaceae* in four volumes; one might describe it in its Latin name as '*Vera multum in parvo et vade mecum cactorem Higginiana*.'"

Every one who grows Cacti, whether for pleasure or profit, should have a copy of this book.

Cash with order is requested. Alternatively books are dispatched C.O.D.

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