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Illustrations shown in brackets. *New species in heavy type.*

THE

CACTUS

AND SUCCULENT

JOURNAL

OF GREAT BRITAIN

Established 1931

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Contents

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SOCIETY NEWS

1950

February 7th, 7 p.m. : Annual General Meeting.

March 21st, 6 p.m. : W. Denton : Succulents from Seed.

April 18th, 7 p.m. : Covent Garden Succulent Corner (bring your spare plants for exchange).

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EDITORIAL

A letter just received from Mrs. Caroline Schmoll does not make good reading, but explains why Mexican collectors and dealers find trading overseas impossible. Some of the information is not quite clear, but here is a quotation :—" Mail charges are so very high and export duties amount to about 20%. Ships going direct to England are few and via U.S.A. the rates are: [Here is a table of rates ranging from 1 kilo (2¼ lbs.) $9.85 to 10 kilos (22½ lbs.) $60.20 ! The dollars are presumably American as dealers' prices are based on U.S.A. currency. With the £1 at $2.80 readers can work out the rates for themselves.—Ed.]. As we did not raise our prices, we cannot pay the export duty which amounts to 15% ad valorem carga and recarga 2% municipal and 105 additional. Further, we have to give 105% of the plants exported to the Forestal Department." Carga and recarga seem to be carriage and re-carriage, the latter term apparently covering transhipment in the U.S.A. We can very well understand and sympathise with our Mexican friends.

How short-sighted is the policy that refuses even a moderate quota in this country. It prevents all scientific study and has the effect of turning collectors' interests in other directions. Scientific knowledge essentially needs collected native plants.

It is good that collectors should know more about South African succulents and should develop their skill in germination from seed, and in this way the misfortune has been of benefit. It is, however, insufficient to counter-balance the necessity of neglecting our studies of cacti.

Lists received. L. de Jongh, Jos Nellenslei 4, Deurne, Antwerp, Belgium ; Cactus seeds and books.

Readers will have noticed how often Mr. Boarder has mentioned favourably the use of frames in the cultivation of our plants, and those attending the meetings have heard him constantly refer to the matter and recommended their use. In our advertising columns is offered an exceptionally fine frame which is admirably adapted for our use. Just now, at the start of the season this is a necessary fitment that is badly needed by many, and the frame can be recommended as a sound, permanent job. Just a point, when installing the frame it is suggested that a brick wall might be built so that the frame is high enough for work within it to be done without bending and fatigue.

It is a pleasure to announce that *Amateur Gardening*, through Mr. C. Norman, their Awards Secretary, have agreed to give a Bronze Medal and a Diploma at each of our Shows during 1950. Further details will be sent to all members in due course.

CULTURAL NOTES

By A. BOARDER

In these cultural notes I intend to have more to say on the seed-raising question. Most members will be looking forward to sowing some fresh kinds of cacti this year, and the earlier the seed can be sown the better it will be for the resultant seedlings. I make no apology for returning to the seed question as so many people are realising that this is the only way to increase the collection. The importation of adult plants is still very difficult, not that it worries me very much, as I have seen too much of the numerous losses among imports in past years. It is well over twenty years since I made up my mind to raise as many of my plants as possible from seed, and today I get just as much pleasure from raising my plants from seed as I did then.

I was not a little surprised to read in the last journal the letter from Mr. R. S. Farden on raising plants from seed. He has come to the conclusion that plants raised from seed flower much better than the imported ones. I have been trying to tell the members of this Society the same thing since the beginning of the Society in 1931. Has he forgotten the plants which I used to take up to the meetings almost each month showing the progress and the resultant flowers on my seedlings ? Has he forgotten the times that I have been ridiculed and almost jeered at for daring to suggest that cacti raised from seed in this country invariably do better than imported specimens ? This only emphasises the fact that if you want to convince anyone in this country of a new idea you have to keep drumming it into them time and again until, suddenly, it registers somewhere. I have said before, and it will bear repeating, that I have flowered several species of *Mammillarias* the year after sowing the seed. I have flowered scores of *Mams.*, and very many *Notocactus*, *Rebutias*, *Lobivias*, etc., in two years, and very many more kinds in three years, and then have flowered the plants each year afterwards. I have had imported specimens in the past and, before they have passed away, have flowered them, obtained seed from them, and raised plants which have grown as large as the imported plant in a matter of two or three years. I can assure all our members that if they have not yet tried the fascinating task of raising their plants from seed they have missed the most interesting and pleasurable part of the hobby.

Now the raising from seed is not at all difficult as long as certain conditions are supplied, and particular attention is paid to all the small details which I have described in the past. I am only too aware that many of our members do not get the success with their seed raising which I enjoy, but I would remind them that I have been experimenting with this system for at least twenty-five years, during which time I have raised plants from seed from almost all the known genera. I have tried to give all my methods in detail, but I still get letters from members to the effect that they cannot get the plants to grow as quickly as mine although they appear to be doing just the same. Where then, is the snag ? In the hope that it will be of use to some, I will briefly run through again my methods for seed-raising.

Use clean pans or half-pots, not boxes. Get some freshly mixed John Innes Seed Compost from a reliable dealer. Sift some of this through a sieve made with a perforated zinc base. Place broken charcoal as crocks in the bottom of the pan, then place the coarsest of the siftings over this. Then place some unsifted compost and finally top with the fine mixture. Bring this up to about half-an-inch from the top of the pan. If you wish to plant more than one kind of seed in one pan, divide the pan with small strips of glass. Number each compartment by pencil on the side of the pot as you cannot use labels. Now sow the seed as thinly as possible on the top of the soil. Only large seeds need to be covered, the others must not be. Now gently press down with a smooth surface, such as the base of a glass jar. Next place the pan in a container of luke-warm water so that the water reaches up to within about an inch of the top of the soil. Leave until the dampness shows on the surface, and then take out the pan for drainage. Place the pan in a frame with a temperature of 70 degrees F., and place a small piece of glass over the pan. You can dispense with the glass in the case of *Mesems.*, and many other succulents as long as the frame can be kept moist. Shade either the frame or the piece of glass so that the sun does not shine on the seed pan direct. Do not allow the pans to dry out before the seed has germinated. The seedlings will appear from four or five days to perhaps a month. A lot depends on the kind of seed, also on its age. Many kinds of succulents appear to germinate better when the seed is a year old, but most cacti germinate well when quite fresh.

Now comes the question of watering. I generally water with a fine spray overhead. The watering can be done by immersion, but, of course, it takes longer to do this, and where there are a number of pans to be dealt with

it may be too long a job for the average grower. Once the seedlings appear you must immediately raise the glass covering slightly so that some more air is available. This is absolutely essential, as otherwise the seedlings will damp off. I find that it is a good plan to spray about once a week with a fairly strong solution of permanganate of potash, not too strong that it is a beetroot colour, but a deep pink. This will help to prevent damping off.

As to transplanting the seedlings ; a great deal will depend on their progress and the condition of the surface of the soil in the pan. You must remember that the seedlings are very tender at this stage and they are easily damaged. Mostly, they are just a tiny green ball with a small root, and the junction of this root with the plant is very delicate. Any rough treatment will soon break this joint and the seedling will die. I have transplanted seedlings fairly early and have succeeded with them, but I find now that it is just as well to leave them alone until they are small cactus plants and are strong enough to be handled. Even if the seedlings remain in the pan for at least a year they will come to no harm providing always that they are not overwatered. If you do transplant you can use the same mixture as the Seed Compost, but add a little more fertiliser, such as a sprinkling of fine crushed bone-meal. When you do transplant you must be careful of the watering ; as long as the soil was damp when you moved the seedlings you should not water for at least a week.

Now these directions should enable anyone to raise cacti from seed with success. If you do have any queries do not be afraid to write to me ; a stamped addressed envelope for a reply will help in these days of austerity.

I will leave the seed culture for the present, and give some advice on seasonal culture. I like to repot all my plants as early in the year as possible. Sometimes this is done in January, and as long as the plants are not watered after repotting they will come to no harm. Go over all the plants and place on one side for first treatment all those which look seedy or are pot-bound. When you do repot any plant it is a good plan to make a pencil note on the back of the label so that if you are in doubt at any time you can refer to the date. I sometimes have to give a second repot in June or July, and then perhaps this plant will not need another repot in the early part of the following year ; the date on the label comes in useful in a case like this. Clean all the pots well before use, and a soaking in a strong solution of permanganate of potash will help a great deal. If you find that a plant has few or no healthy roots it is advisable to encourage the growth of fresh ones before it is finally potted up. You can keep a rooting box containing either coarse sand or Vermiculite, and put the rootless plants in this in as warm a position as possible. Once new roots have been formed it is then safe to pot up, but do it carefully, so that the roots are not broken.

Remember that if a plant is not growing it is more necessary than ever to repot it. Probably the soil has become sour and useless or the roots may have rotted. If, on the other hand, when a plant is removed it is found that the roots appear quite healthy and the soil in fairly good condition there may be no need to remove much of the soil from the roots but just repot in another pot slightly larger than the previous one. Although it is not necessary to use very large pots it is essential that you use one which will allow the plant to grow well. Do not ram the soil down too hard in the pot as this will get plenty hard enough before long owing to repeated waterings. The time to commence watering will depend a great deal on the position in which the plants are kept. If they are in a house you may not have to start watering regularly until the end of March, but if the plants are in a greenhouse then you may water as early as the end of February. This will, of course, depend on the weather at the time as it is dangerous to water during frosty weather, if, on the other hand, we get a mild spell, as often happens, the plants can have a drink as long as you make sure that they are not watered again until they have dried out. This is the whole secret of growing cacti ; if you don't know when or when not to water you will never grow cacti successfully. Once you have mastered the art of watering there is little more to learn and, after all, what could be more simple ; water well when you do water so that the whole amount of soil in the pot is moistened and then do not on any account water again until the soil has dried out again. It sounds easy enough, or is it ? If so, why do so many people go wrong ? Whatever compost you use to plant the cacti in, if you water wrongly you can soon be in trouble whether you use a rich compost or pure coarse sand. In the past I have grown cacti in all kinds of composts, and have been able to grow them in varying degrees of success. There seems no end to the hardiness of some kinds, and when I think of the different treatment which I have given to some of my plants in the past, I marvel to think how they ever survived. There can surely be no class of plants grown in pots which can stand so much harsh treatment as the wonderful cacti.

THE MAGDALENA PLAIN

By HOWARD E. GATES

Nearly three-quarters of the way down the finger of land known as Lower California, Mexico, the western shoreline bulges to meet the waters of the great Magdalena Bay. At this point, the mountain range which forms the backbone of the peninsula lies closely along the eastern shoreline of the peninsula. This range is so precipitous and rugged it has never been fully explored by botanists. The western slope of this range falls rapidly, and from its foot extends the broad sedimentary Magdalena Plain. The bay is cut off from the open sea by a barrier of islands. Santa Margarita and the southern end of Santa Magdalena Island are ranges of small mountains running roughly north and south. These ranges apparently have no connection with any other range, which may account for the occurrence of plants found nowhere else. North of the village of Magdalena, on the island of the same name, the hills level out to form the tableland of Mesa Santa Maria, which, in turn gives way to a great sand bar extending at least seventy-five miles farther northward on the outer side of a series of channels and lagoons. This sand bar is broken only by the solitary peak known as Cape San Lazaro, and several shallow channels from the ocean to the lagoons. The entrance to the bay, which is so great that forty years ago it was used as a target range for the United States Navy, lies between Margarita and Magdalena Islands. On Margarita are deposits of manganese which were worked during World War I. South of Margarita several low sandy islands swing south-easterly to enclose the southern section of the bay. Owing to the scarcity of water on both the plain and the islands, the agricultural resources of the area have never been developed. The small village on Magdalena Island is supplied with drinking water brought by boat from Margarita Island. The bay is almost deserted except as an anchorage for fishing boats coming down from Upper California.

The climate really is temperate. Frost is unknown. Constant breezes from the Pacific keep the area from becoming extremely warm. Rains are infrequent and very uncertain. Frequent low and damp fogs foster a heavy stand of small trees on the plain, and a grotesque growth of Bromeliads and Lichens on their branches. Yes, even on the spines of the cactus !

The coastal margins of this plain are the only places where the queer Creeping Devil Cactus, *Machaerocereus eruca*, is found. The first sight of one of these colonies is really eerie. The plants look for all the world like a horde of gigantic hairy caterpillars on the prowl. Except for the elevated tips, the plants lie prostrate on the ground. The elevation of the tip permits a branch to grow over another branch or an obstruction. When the tips get heavy, they sag to earth and take root at various places on the under side. When occasional seedlings grow, their branches radiate like spokes of a wheel. After a time, the centre of the plant dies and each branch goes merrily on its way as a separate plant. I say " goes " advisedly, as this dying of the older portion of the plant takes place periodically, so this is a plant that actually moves from place to place. The branches are three to four inches in diameter, heavily armed with stout and broad, yet very sharply pointed, gray spines. The central spines are reflexed toward the body of the plant and are diabolically placed at just the right height to penetrate the side of a shoe. It was a difficult task to get the burro (donkey) I was riding to enter a colony of these plants for the purpose of taking a photograph. The spines of the growing tips are reddish and placed in very attractive patterns. The trumpet-shaped flowers are said to be yellow though it has never been my pleasure to see them. There is an oft-repeated fairy tale that these plants always grow with their heads to the sea. Actually, the branches grow in every direction. A single fine plant in my botanical garden has branches facing all points of the compass.

Occasionally in or near the Creeping Devils are low mounds that look like piles of weathered sticks and twigs. The natives call them Casa de Rata or the Rat's House. Really they are the *Echinocereus*-like clusters of the low growing *Opuntia invicta*, whose matured spines are a weathered gray. During the growing season the young spines are highly tinted with red. The flowers are lemon-yellow as are the densely-spined fruits.

There are great colonies of the *Opuntia* species botanically known as *cholla*. These are arborescent, occasionally reaching a height of ten feet. The gray-green branches are composed of comparatively short, stout joints. The flowers appear in varying shades of pink or rose. The almost globular fruits are proliferous. That is, other flower buds develop on the older fruits and keep on doing so until the fruits will hang like a string of gigantic beads. When fruits fall to the ground, they take root and produce new plants vegetatively rather than growing them from seed. The weathered woody stems of *Opuntia cholla* make excellent firewood though somewhat mean to handle because

of the spines. The branches are an important item in the diet of cattle. Cattlemen say that once a cow forms the habit of eating cactus she cannot be broken of it, and will never get fat as long as she eats it. There might be an idea here for some of the girls that worry about excess weight !

Occasionally growing up through bushes may be found an undescribed *Opuntia* of the *Leptocaulis* group. Though barely the diameter of a lead pencil, these branches are several feet long, bearing numerous side branches and wicked spines. The short-jointed side branches fall off at the slightest touch. The flesh-coloured flowers are followed by scarlet fruits. The fruits are proliferous, usually producing new branches rather than new flowers. One has grown in my garden for years, and I often say one is enough. Once a year it is heavily pruned and all the branches carefully raked up as each little piece will grow.

It takes a sharp eye indeed to find the slender branches of *Wilcoxia striata* growing up through shrubs. The long dark branches are likely to be mistaken for dead twigs. The shallow grooves between the ribs appear merely as lines and the spines are so small they are barely noticeable. The rose-pink flowers are usually a couple of inches in diameter. The globular, scarlet fruits bearing a few clusters of white spines are among the most beautiful of all cactus fruits.

Lophocereus Schottii grows in scattered thickets especially along the sandy wash bottoms. On this plain the hoary tips of these plants reach a height of ten feet. The heavy branches rising outward and upward from the base of the plants are usually five-ribbed with short, stout spines on the lower portions contrasting strongly with the dense covering of longer, weak spines on the flowering tips. These bristly spines are a straw-yellow when young, turning to gray or even black in age. This is one of the few cactus that produce more than one flower to the areole or spine cluster. The flowers are nocturnal, usually lasting till mid-morning. Branches bearing pink flowers, green and scarlet fruits, all at one time, are quite a sight.

On the southern edge of the plain is the restricted known range of my favourite namesake, *Lophocereus Gatesii* (Jones, Cac. & Suc. Jour. of America, Vol. V, p. 546), which differs from all other *Lophocereus* in that the many ribs produce a fluted rather than angular appearance. The spines are somewhat longer and more numerous than in the other species. The flowers have been described as a water melon pink.

Scattered through this greatest plain of Lower California, are numerous colonies of *Lemaireocereus Thurberi*. Individual plants send up numerous, nearly vertical branches from a short basal trunk to a height of ten feet or more. These fluted branches may reach six inches in diameter, and their ribs are lined with clusters of rather short brown spines. This is the most useful of all the cactus as it bears the large tasty fruit known as Pithaya Dulce. When the fruits are ripe it is really feast time for these fruit-starved people.

The dominating cactus of the plain is *Pachycereus Pringlei*, though here the plants are much smaller than in the wind-protected and hotter inland ravines. They reach a height of twenty-five feet with a trunk diameter of three feet and a branch diameter of one foot, which, of course, brings it out of the midget cactus class. Especially when exposed to the sea breezes, the branches develop numerous constrictions in contrast to the unbroken columnar outlines of the inland forms. This peculiarity has probably been the basis of the descriptions of the varieties known as *titan* and *calvus*. The large funnel-form white flowers appear mostly on the south side of the branches, near their tops. The large spine-covered fruits look like chestnut burrs. These eventually split open to expose the large black seeds embedded in red, orange or white stringy pulp.

Machaerocereus gummosus, the most omniprescent large cactus of the peninsula is found here in great thickets, sometimes covering an acre. The branches are two to three inches in diameter, rising to four or five feet, after which the weight proves too much for their weak woody frames and they sprawl and bend over to the ground where they frequently take root. The general colour of the branches is dark green shaded with brown and deep red. The clusters of dagger-like stout spines are a light gray to brown. Large nocturnal white flowers are shaded with lavender. Though the large scarlet fruits bear many spines, they are very edible for man and beast.

The *Ferocactus* of this region were mentioned and illustrated in the October (1949) Journal.

The smallest cactus of the region and the only *Mammillaria* is *dioica*, which often grows in great abundance. It varies greatly in habit. Sometimes there are very large singleheads, other times great clusters of smaller heads.

While the spine colour is variable, the most customary is a reddish brown. The small flowers are yellow with red, brown or purplish outer shadings. The long scarlet fruits are more attractive than the flowers.

Without examining the fruits, *Euphorbia* collectors probably would not recognise the two most plentiful forms of the plain. *Pedilanthus macrocarpus* grows in clumps of grayish green rods to a height of several feet. These rod-like branches are only a little over a half-inch in diameter and are leafless except for slender leaves on the young growing tips. The scarlet flower well justifies the generic name which means slipper or shoe flower. The fruit terminates in a sharp point while the stem end is ringed with six quarter-inch long points. The abundant white sap carries a high percentage of latex, is very viscid and irritating to tender portions of the body. The other more abundant and larger-growing group is composed of *Jatropha canescens* and several similar species. These form spreading trees to about fifteen feet in height with numerous heavy branches arising from or near the base, with lateral branching above varying with the species. The heart-shaped leaves are three inches or more across, but the flowers are disappointing. They are inconspicuous bells about the size and shape of an Erica melanthers floret. The fruit-bearing three large seeds, each in its cell, is an inch or more in diameter.

A more colourful shrub or small tree is *Fouquieria peninsularis* (Diguetti) or Ocotillo commonly called Palo Adam (Adam's Tree) because it is usually naked. In dry weather these plants drop their leaves and remain leafless until another shower gives them a drink. The first crop of leaves on a new branch is borne on long petioles. At maturity these leaves dry up and expose inch-long thorns which were buried in the under-side of the petiole. Subsequent crops of leaves which are from the axil of this thorn are on short petioles. The tubular, cleistogamous scarlet flowers are borne in racemes on the ends of the branches.

The only *Yucca* of the plain is *valida*, an arborescent form somewhat resembling the Joshua Tree of Upper California. Large trusses of cream-coloured flowers resembling lilies are borne on the ends of the branches in late spring. Our investigation of these plants has delayed our arrival at Medano Amarillo on the shore of Magdalena Bay. This-place name means yellow sandhill, and that is about all that we find there. However, we pitch our camp and wait for an opportunity to cross the bay to Magdalena Island.

Mr. Howard E. Gates writes that he has made an error in his article on *Ferocacti* in the October, 1949, Journal. He stated that *Ferocactus peninsulae* came from San Fernando. He should have said the town and mission of San Ignacio. San Fernando is near the 30th Parallel and San Ignacio near the 27th, so it makes quite a difference in location.

Members who received some of the seed that came from Mrs. Nevin would be of great help if they write the editor giving their results. Mrs. Nevin writes that she would like to know as a guide. The details needed are the percentage of germination, what species were successfully germinated, etc. Any suggestions members like to make will be welcome.

The second edition of J. J. Verbeek Wolthuys' The Enigma of the Origin of Monstrosity and Cristation in Succulent Plants, with 14 illustrations, has been received. It is printed in English and in Dutch. The thesis is very fully dealt with in a most interesting manner, and the drawings and illustrations complement the letterpress very well. Mr. Verbeek Wolthuys' general conclusion is that cristates and monstrose plants are hereditary and not the result of injury or external influences, but it is doubtful whether all the phases covered by the author should come under his title. It is interesting to note that the author considers that dichotomy is a forerunner, or, at least, immature cristation. Although his views lean towards hereditary causes, his conclusions are that this is not definitely proved and that the actual cause has not yet been established. To those who are interested in these malformations (it is not certain that we are correct in so naming these plants) the book is of great interest and it will give the general reader much to think about, especially as it is written in a lucid and simple way so that no great scientific knowledge is needed to read and enjoy a very remarkable contribution to our subject. Translation was by our Journal subscriber, Mr. J. A. Schuurman, and the book is published by Publishing Co. " De Torenlaan," Assen, Holland.

PACHYPODIUM NAMAQUANAM

By H. HALL

It is about twenty years since I first saw this rare and wonderful succulent, in cultivation at Kew. Specimens in cultivation are among the rarest and most prized possessions, even today. Although I cultivated a very large collection of succulents in Manchester, I never had a *Pachypodium namaquanum* to deal with. Occasionally, amongst old periodicals, I would glean details of their native haunts and would wonder whether I'd ever have the luck to see them in their wild state.

During my first exploration into Little Namaqualand for succulents in 1948, I did not see this species although I was, at one time, but five or ten miles from at least one known locality. In August, 1949, we planned to find it at all costs and to gather, if possible, a few small specimens for Kirstenbosch and the Karoo Garden. My fellow explorer had been to the particular area some thirteen years previously, a spot in the heart of L. Namaqualand known as Umdaus. I must explain here that although well-known place names exist, one is never quite sure whether one is there or not for there are never any road signs, dwellings, or other indications. No fellow travellers or other humans to ask the way. No maps of mine mark Umdaus, but several plants bear its name, e.g., *Lithops umdausensis* and *Caralluma umdausensis*. This portion of L. Namaqualand is the home of some of our most treasured species of succulents and is a region of stony hills, extremely low rainfall and very sparsely populated. As a matter of fact we saw no human beings for two whole days in that area.

A long, dreary road terminated at a stony, dry river bed—most Namaqualand rivers are dry for years on end—and here we parked the lorry. About five miles to the west was another range of hills ; " Umdaus," my companion announced. With our picks and our two native boys carrying a wooden stretcher we set off on foot. The rare and interesting succulents we noted *en route* will not be dwelt upon here, but they made the long tramp over rocks and along winding animal tracks through the thorny scrub much less tedious. Although it was a winter's day, the sun was uncomfortably hot, blazing from a cloudless sky, and the air was still. Then we could make out the *Pachypodiums* on the skyline of the nearest hills, their stout trunks rearing up into the clear, dry air, looking somewhat uncanny in their stillness. The geology in those parts consists largely of whitish quartz and brownish shales full of mica deposits, both the quartz and mica giving a curious glitter in the sunlight. Closer inspection revealed that the *Pachypodiums* were all growing in crevices of the quartz, always on the hottest, i.e., northern side of the hills, and invariably where the rocks were quite immovable, consequently their fat bases were cruelly compressed due to increase in girth. Undoubtedly, such firm anchorage is vital to withstand the fierce winds that sweep across the desolate hills, as well as to support a bulky, massive trunk.

Normally unbranched throughout their long lives, several being at least nine feet in height, there were a few, injured perhaps during infancy, with several branches. When it is realised that old plants are about nine inches in diameter at the base, tapering gradually to the top, one might gain a rough idea of their great weight. The cylindrical trunks resemble a columnar cactus but without the ridges, and are clothed with long, straight thorns, both trunk and thorns being a greyish-brown in colour.

Early in the winter, if sufficient rain has fallen, a crop of new leaves forms at the apex—though droughts of several years' duration are frequent—the leaves being a greyish-green, crinkled, slightly felted, while a new pair of spines forms at the base of each leaf. A few weeks later a crop of flowers are borne in the centre of the rosette of leaves ; these being tubular, 20 or 30 in number, of a maroon colour. Our delight was evident when we observed they were all in flower. I learn that the seed ripens in a few weeks, after which they, and the leaves, are scattered by the winds. The plants then assume their stark, sentinel-like mien for the next nine or ten months. It was some time before we could find about half a dozen specimens (all we could carry with the other plants gathered there) for, like many other large and slow growing succulents, small plants are very scarce. More difficult still was to find suitable ones in rocks leverable with our picks.

Not the least interesting thing about the *Pachypodium* is the curious bending of the apex to the north. It is a phenomenon that impresses immediately. According to Hottentot legend they are petrified sentinels, transformed humans, their heads all looking to the noonday sun, and known to them as " Half Mens."

I glanced back several times as we tramped back to the east, and the lorry, fascinated by the sight of the " Half Mens " on the skyline, now silhouetted sharply against the setting sun, until distance faded them out and there was but the outline of the hills. We were more than 500 miles from Cape Town and still had much more ground to explore, but we made sure that our precious *Pachypodiums* had the most comfortable journey, wrapped in sacking on the roof of the lorry.

MINIATURE TABLE GARDENS

By ERNEST H. HEPWORTH, F.R.H.S.

Only those who possess a Miniature Table Garden know the joy it can bring. It needs such little attention, yet will keep in good condition all the year round if proper instructions are issued with it, and are faithfully followed, and also if it is in the right kind of bowl.

I am referring, of course, to a miniature table garden composed of cacti or succulents.

It is essential that the little garden should be kept as near as possible to the window of a sunny room, where it can get the maximum of light and sunshine.

If the bowl has an outlet in the base, a saucer or container must be placed underneath, otherwise it would, of course, ruin the table, or whatever the garden stands on. A hole in base of bowl is absolutely necessary unless the bowl is a special one which must be semi-porous, and made only for cacti or succulents, only then is an outlet unnecessary. I have found by experience that this latter type of bowl is best. Avoid the type of bowl or container which is smooth inside, without a hole, such as bulb bowls.

Charcoal and crocks should be placed at the bottom of the bowl, and good earth, with plenty of coarse sand mixed with it, on top, and the smaller types of either cacti or succulents planted in it. Rocks, or better still, models which are tropical placed among the plants. It can look amazingly realistic with the right type of little figures, houses, etc., arranged in an artistic manner.

It should be watered according to the temperature of the room, and the time of the year. If it drops below 40 degrees at night then it should be kept on the dry side, but if it is warm during the day it will need a little water (preferably tepid), but never too much in wintertime, as the plants are resting then. In hot weather it may be watered once or twice a week, watering so that the water just about reaches the bottom of the bowl.

If the earth should in time become a little hard on top, loosen same gently with a table fork.

During hot spells in summer the garden may be placed outside on a window sill or elsewhere, but brought in at once if the weather changes.

It must be remembered that plants like plenty of fresh air, if it is not over-cold, but they dislike cold draughts.

I have known some people to keep a miniature cacti or succulent garden in the centre of the room, instead of near a window ; this is a great mistake, for the plants grow thin and quickly die. It is also fatal to keep them too dry in hot weather, or there again it is wrong to saturate them in very cold temperatures. If any of the plants should eventually overgrow these can be trimmed or cut back usually. (The plants should be the smaller growing types mainly.)

A miniature table garden may be kept in a heated greenhouse, but if the greenhouse has a tendency to become overheated, then the plants may grow too quickly.

The largest table garden I possess is 25″ long by 18″ wide, and not only has houses, but a working model well, lawn, flower beds, lake, gateways, hedges, many figures, bridges, paths, special succulents,—in fact everything one might see in a real tropical garden. Both this and my smaller gardens have given pleasure not only to myself, but to all who have gazed upon them. (A photo of this large garden was in the October, 1949, Journal, and one of a small table garden is in this Journal.)

The programme for 1950 is as follows :—February 7th, Annual General Meeting ; March 21st, W. Denton, Succulents from Seed ; April 18th, Covent Garden Succulent Corner (bring your spare plants for exchanges) ; May 2nd, June 13th, July 11th, Summer Show and evening meeting also ; July 16th, Visit to Mr. Harle ; August 29th, September 12th, Autumn Show and evening meeting also ; October 10th, November 7th, December 5th.

EXHIBITION, OCTOBER, 1949

Owing to the darker evenings and difficulties of transport, there were not so many entries as for the summer Exhibition, and the quality of the exhibits was not quite so good. At the same time, it was a fine, brave show, and it caused a great deal of interest. Why is it that so many more of the public seem to be interested in the autumn show rather than the summer one ? Possibly the greater variety of other plants at the summer show is the reason ?

Class 1 Three *Echinocactanae*. 1, P. V. Collings ; 2, Mrs. M. Stillwell ; 3, Mrs. J. A. Wells.
Class 2 Three *Coryphanthanae*. 1, P. V. Collings ; 2, Mrs. M. Stillwell ; 3, H. J. Aylott.
Class 3 Three *Cereeanae*. 1, P. V. Collings ; 2, Mrs. M. Stillwell ; 3, H. J. Aylott.
Class 4 Three *Echinocereeanae*. 1, Mrs. M. Stillwell ; 2, H. J. Aylott ; 3, Miss D. M. Poore.
Class 5 Three Cacti (any genera). 1, P. V. Collings ; 2, Captain H. J. Dunne Cooke ; 3, Mrs. M. Stillwell. Very highly commended : Mrs. S. J. Cutler.
Class 6 One Specimen Cactus. 1, Mrs. J. A. Wells ; 2, Mrs. M. Stillwell ; 3, Captain H. J. Dunne Cooke.
Class 7 One Specimen Succulent (not cacti). 1, Mrs. M. Stillwell ; 2, Captain H. J. Dunne Cooke ; 3, P. V. Collings.
Class 8 Three *Faucarias/Stomatiums*. 1, Mrs. M. Stillwell ; 2, Captain H. J. Dunne Cooke ; 3, A. J. Edwards.
Class 9 Three Stemless *Mesembryanthemums*. 1, Mrs. M. Stillwell ; 2, Captain H. J. Dunne Cooke ; 3, P. V. Collings.
Class 10 Three *Haworthias, Gasterias/Aloes*. 1, Captain H. J. Dunne Cooke ; 2, Mrs. M. Stillwell ; 3, Miss H. Mackenzie.
Class 11 Three *Euphorbias*. 1, A. J. Edwards ; 2, Mrs. M. Stillwell ; 3, P. V. Collings. Very highly commended : Mrs. N. Drury.
Class 12 Three *Crassulas*. 1, Mrs. M. Stillwell ; 2, A. J. Edwards ; 3, P. V. Collings.
Class 13 Three *Sempervivums/Sedums*. 1, Mrs. M. Stillwell ; 2, Mrs. N. Drury ; 3, H. J. Aylott.
Class 14 Three *Echeverias/Cotyledons*. 1, Mrs. M. Stillwell ; 2, P. V. Collings ; 3, Mrs. J. A. Wells. Very highly commended : Miss H. Mackenzie.
Class 15 Three Succulents other than cacti. 1, Captain H. J. Dunne Cooke ; 2, Mrs. M. Stillwell ; 3, Mrs. J. A. Wells.
Class 16 Six Succulents other than cacti. 1, P. V. Collings ; 2, Captain H. J. Dunne Cooke ; 3, Mrs. M. Stillwell.
Class 17 Succulents, other than cacti, raised from seed sown on or after 1st January, 1946. 1, K. H. Walden ; 2, Mrs. J. A. Wells.
Class 18 Succulents, other than cacti, raised from seed, not more than three years old. 1, Captain H. J. Dunne Cooke.
Class 19 Beginners' Class, three Cacti. 1, W. H. Scott ; 2, Mrs. E. Jackson ; 3, Miss J. Neave.
Class 20 Beginners' Class, three Succulents. 1, Mrs. E. Jackson ; 2, W. H. Scott.
Class 21 Three Cacti or Succulents grown in living rooms. 1, Captain H. J. Dunne Cooke ; 2, Mrs. E. Luker. One exhibit was disqualified as more than three plants were exhibited.
Class 22 Photographs. No entries.

A very fine non-competitive exhibit by Mr. J. Norman, of Horley, was very much appreciated.

It will be noted how many times certain members gained awards. Only 16 members entered for the show. It is to be hoped that during 1950, when we again have two shows, special efforts will be made to increase the number of the exhibits and exhibitors. A special effort is being made by the society to this end, and details will be published in due course. It is not only the competition of exhibits that matters, but when a strong show is made, it arouses a great deal of comment, and all who were at the R.H.S. New Hall, must have noted the large number of the ordinary public who were intently and closely examining our various exhibits. These comments are not intended to decry the quality or the quantity exhibited, but we know there are many more members who can show plants in one or other of the classes, and we would point out that their participation would increase the interest of the public and introduce our plants to them and, thereby, gaining new collectors and, we hope, new members for the society.

(We regret it is impossible to reproduce photographs of the Show. Two photographs taken were failures owing to the lack of light—being winter there was only artificial lighting. We had no flashlights.—Ed.)

STEMLESS MESEMBRYANTHEMUMS

By G. G. GREEN

Since the publication of my last article on *Mesembryanthemums* (January, 1948), I have had many requests from readers who are keenly interested in these plants to enlarge my comments on the subject and to give more details of other species.

Judging from trade enquiries, many collectors are turning, or about to turn, to the specialisation of the more stemless species, of which there are a great number, and it is to them, mainly, that I add these further notes on the genera. Only a few are dealt with in this article.

For those of us who have the room, or who have definitely decided to concentrate on *Mesembryanthemums*, the finest way, undoubtedly, to grow the species is to construct a " garden " on the staging where the plants can be grown without pots, directly into the soil. This means a strong structure of some sort, preferably of concrete slabs cemented on brick supports, as it would be very annoying for the whole staging to collapse at some later date. Whatever the medium, it should be strong, obviously, and the care taken in its construction will be worth while.

Along the front edge, rough stones, or rocks, of granite or weathered limestone can be cemented, and a row of bricks, on edge, fixed on the back edge, with other stones on top of these. When soil is placed on the staging, a slight slope towards the front or path will be evident, and this will enable a better view of the plants to be obtained. The sunniest side of the greenhouse should be chosen as *Mesembryanthemums* love full sun, and species of each genera can be planted together in groups so that the watering problem is simplified.

As in the case of sunken pots, described in a previous article, empty pots sunk here and there in the soil can be used as watering vehicles, the tops being covered with a stone to hide the hole. The surface should not be flat but have raised portions here and there helped by stones to hold the pockets of soil, in which different species can be planted. This will relieve the monotony of a flat surface and also tend to give a realistic impression of the natural habitat. Loose gravel or pebbles should cover the soil, with granite chippings and pieces amongst the larger species such as *Pleiospilos*, *Glottiphyllum*, etc. With a little imagination, a most pleasing and natural effect can be obtained at little cost.

Plants sunk in their pots can be fixed in such a setting with the same effect, and for those collectors who like to show at exhibitions, this would be, perhaps, the better plan, as planted specimens should not be moved unless they have disease or are not growing well. In planting or sinking pots, care should be taken to place the species where they can receive full benefit of the light. By this, I mean, be sure not to plant large growing species in close proximity to smaller ones so that the latter are in perpetual shade, but arrange them so that the smaller growing types are in the raised pockets, or well away from the big ones.

Where neither of the above methods can be used, pots can be placed in trays made from zinc or copper, and containing sandy gravel which may be watered when necessary so that the roots of the plants obtain moisture from the bottom. In all cases, as much light as possible is necessary to prevent drawing and unnatural growth and to stimulate production of the colourful flowers.

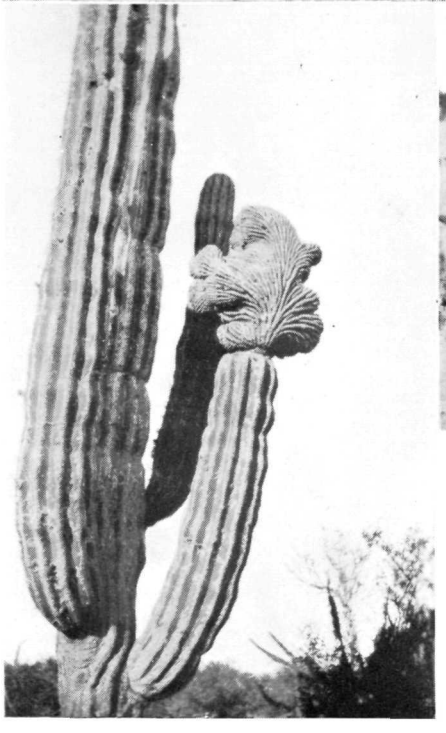
Of the many species from which to choose, I propose to start with those that can be grown easily, and which are fairly easy to obtain, and which give bright coloured flowers. Flowering periods vary throughout the year, and it is possible to have blooms at almost any month.

The *Opthalmophyllums*, very similar to some *Lithops*, are very interesting plants. They are small, stemless, without tap-roots and with shiny, soft bodies, bright green suffused with red, deep clefted. The flowers are fairly large, in white and pink, produced in autumn and early winter, which is the growing period. They should be kept dry during their rest, and only lightly watered when growing as, it being winter, they dislike our damp. A sandy soil is preferable, though the usual compost described before, is quite good. Species include *O. Dinteri*, lilac-pink flowers ; *O. Friedrichiae* ; *O. Schlecteri*, pink ; *O. Triebneri*, large white scented flowers.

Argyrodermas grow in clumps or clusters of stemless bodies, bluish-green in colour. The shape varies in the species, but most have thickened oval, keeled leaves in pairs, low-growing and fat. The growing period is in our summer when the flowers are produced freely. These are large, yellow, pink and rose. The plants like moisture during the growing period, but very little in winter. Young plants, however, should be prevented from shrivelling by watering when these signs appear in winter. *A. Braunsii* has long, finger-like leaves, curved at the tips with yellow flowers. *A. Jacobsenianum* grows quickly into clumps of thick, oval, keeled leaves. Flowers yellow, thin

Lemaireocereus Thurber

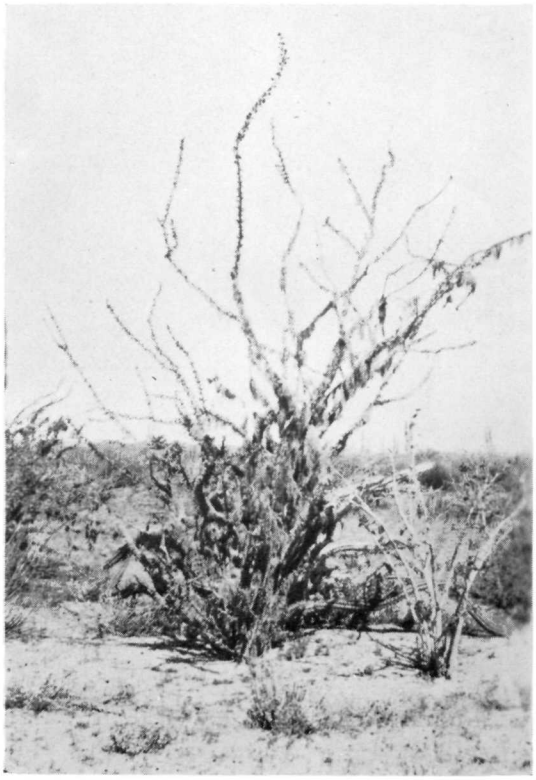
On the way to Magdalena Bay



Creeping Devil Cactus
(*Machaerocereus eruca*)

Pachycereus Pringlei including crest

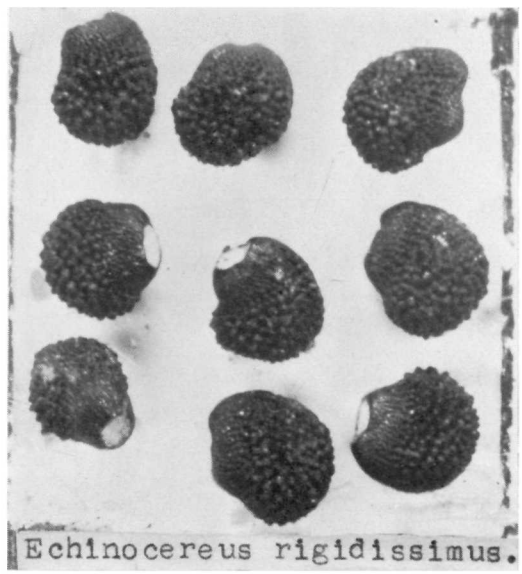
All photos by Howard E. Gates



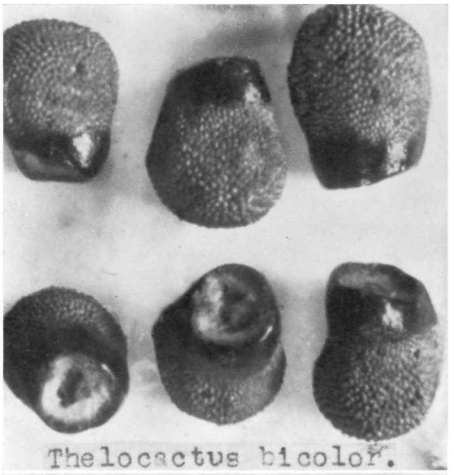
Fouquieria peninsularis Howard E. Gates

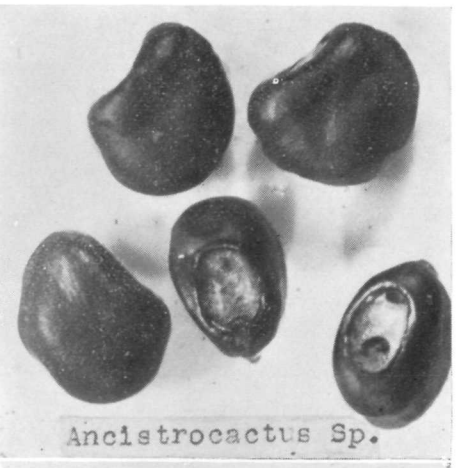
Yucca valida Howard E. Gates

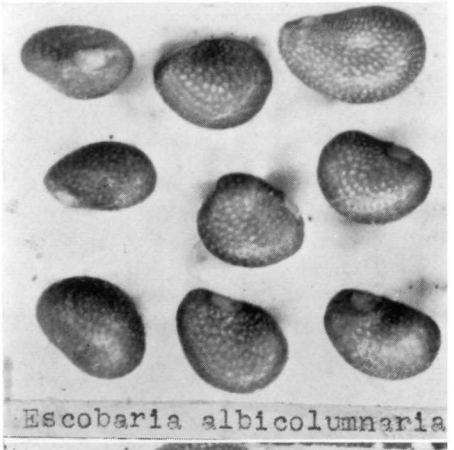
Neobesseya missouriensis J. P. Hester

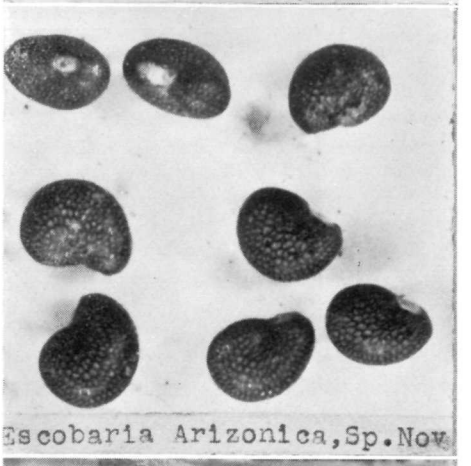


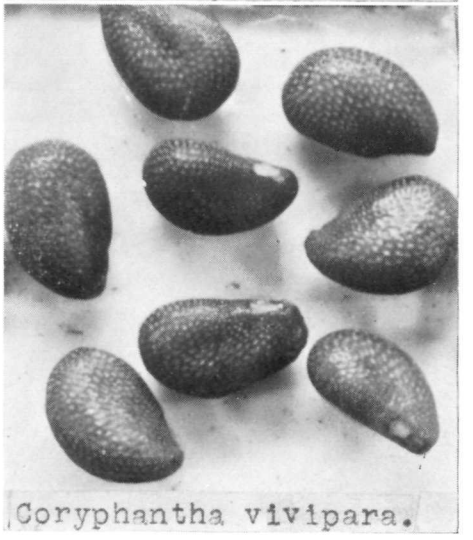
Echinocereus rigidissimus J. P. Hester





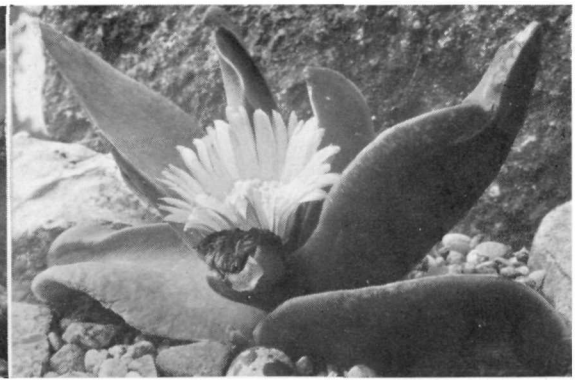




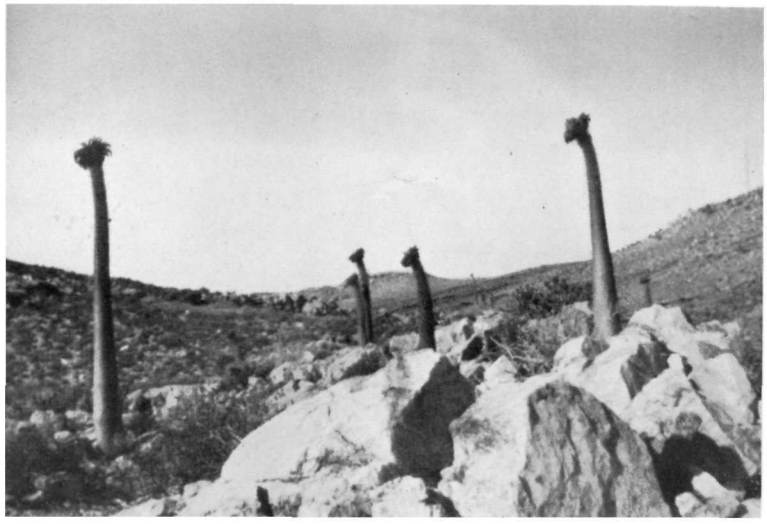


All photos by J. P. Hester

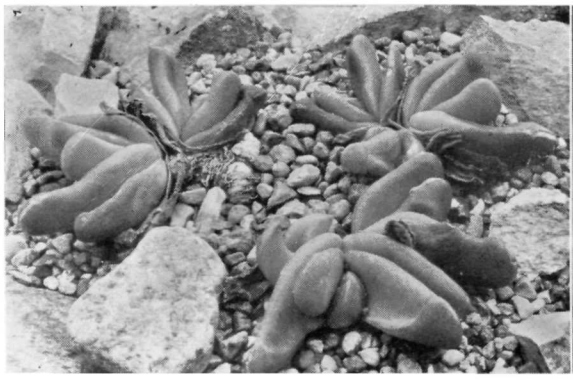
Glottiphyllum Neilii H. Jacobsen



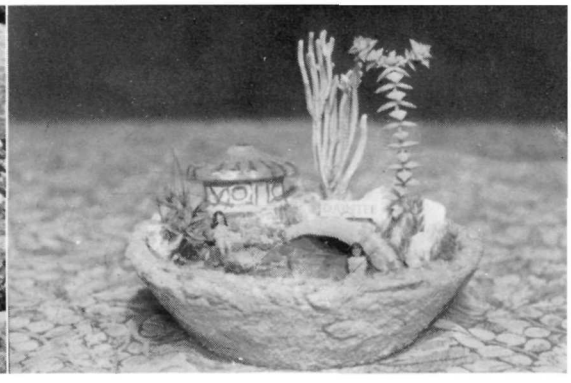
Glottiphyllum linguiforme H. Jacobsen



Pachypodium namaquanum J. Thudichum



Glottiphyllum Nelii H. Jacobsen



Miniature Garden E. H. Hepworth

petalled. *A. testiculare*, called *A. octophyllum*, with twisted petals, yellow. *A. roseum* has extremely large rose-red flowers, much bigger than the plant itself. *A. Schlecteri*, smaller bodies, rose-red flowers.

Dinteranthus. These stemless plants are very succulent and need little water at all times, especially in our winter, which is their resting period. The half-round, slightly keeled leaves are greyish-white, with flushes of blue or pink, and bear yellow flowers in summer. *D. inexpectatus*, *microspermus*, *Pole-Evansii*, and *puberulus* are perhaps the most common and should take a proud place in the collection.

Frithia pulchra is a very attractive plant with its short, cylindrical window-topped leaves. The flowers appear in early spring, carmine-rose with a white centre, large and extremely pretty. Growing period is in our winter, and this often causes a lot of trouble to some people. The plants need water during these months and this should be given from underneath, never from the top where the moisture might settle amongst the leaves and cause the plants to rot. Where the plants are grown in pots, they should be stood in about 2″ of water for such time until the moisture has risen half-way up the pots when they should be allowed to drain. Full sun is best, and a very porous sandy soil rich in leafmould can be used.

Allied to this species are the *Fenestrarias*, the "Babies' Toes." These have similar growth with smoother leaves, windowed at the tips and liking a very sandy soil. The roots are very long and soon find their way through the drainage hole in the search for moisture. Growing period is in early summer when water can be given by the method described above. As much light as possible should be given them.

The *Gibbaeums* differ a great deal in form and colour, but all are attractive when in flower. The stemless species have oval, nearly round leaves in pairs, closely pressed, greyish-green to light green in colour, smooth or velvety. They like a rich soil, very porous, with a fair quantity of sharp sand. When the outer leaves begin to shrivel, it is a sign that water should be given, and care must be taken not to over-water. They are fibrous rooted and moisture should be allowed to percolate farther up the pots than as before. The flowers are white and yellow, or lilac to red, and appear at the end of the growing period which is generally from winter to early spring. *G. album* is a very pretty species with velvety leaves and large white flowers. *G. perviride* has longer triangular-rounded leaves with red flowers in early spring. *G. pubescens* grows with short stems, getting woody with age. The leaves are uneven in length, long and narrow, well keeled and velvety. The flowers are very pretty, violet coloured. *G. Shandii*, similar in growth, but on very short stems. The growing period is in late winter to spring. Reddish flowers. *G. velutinum* has pointed triangular leaves, stemless and keeled, greyish to dark green. Flowers, white in spring. *Lapidaria Margaretae*, is a single species formerly named under *Argyroderma* and *Dinteranthus*. The leaves are pearly-grey suffused with pink, triangular and rounded on the backs, rather small. Flowers are formed on long stalks, very large, yellow. Plants are easily raised from seed during the spring. Water should be withheld for the resting period, but given liberally during early summer. Plants quickly form tight clumps and are very attractive. For the species described, heat is not necessary if precautions against frost are taken. Covering with brown paper on cold nights will help to keep the cold out.

To be continued.

If you have not already paid your subscription, would you be so good as to send same to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, without delay. It would surprise members how much they would help the Society, not to mention the Treasurer, if subscriptions were paid in promptly. In addition, prompt payments enable the Council to appreciate the financial position so much better and they can plan forward with greater confidence for brighter and better things for members.

In the feature "In your Garden," Mr. Boarder broadcast at 2.15 p.m. on the 18th December. Naturally, his task was to appeal to the popular mind, and what he said was nothing new to what he has told us hundreds of times in his articles in the Journal and by his lectures at our meetings, but it was indeed pleasurable to note the competent way in which he put his address across, and it must have given a great deal of help to those listeners who have cacti and do not know what to do with them, and it may result in many increasing their interest in our plants. Mr. Boarder is to be highly complimented on the very able, competent and interesting way in which he handled his broadcast, and the thanks of all interested in our plants will go out to him.

MAMMILLARIANAE

By J. PINCKNEY HESTER

The science of Cactaceae, like other branches of science, can advance only as an exhaustive study of known facts lead to the development of new concepts that more thoroughly fit and help to explain those facts. Such a concept was monographed by field observer in December, 1941*.

In that article magnified seed photographs were used to demonstrate that each genus of Cactaceae has its own distinctive, easily recognisable seedshape, pattern or design. Some of those revealing photographs are reproduced in this Journal in lieu of temporarily unattainable photomicrographs of the various seed shapes displayed by the multitudinous members of *Mammillarianae*, which now number about 300 and, ultimately, may attain a total of more than 500, when its homeland, Mexico and the U.S.A., are finally and fully explored.

Dr. Engelmann was the first Cactacean to recognise the vital importance of seed patterns in segregating species, but he saw too few generic seed designs to get far along that line of thought.

Messrs. Britton & Rose, in their Cactaceae, must have depended largely on seed patterns when describing so many new genera, each of which has its own seed shape, but these gentlemen inadvertently omitted to mention that fascinating fact in their text.

The most enticing thing about this generic seed concept is that its truth is readily proven by anyone with a 10x glass and the seeds of a few genera.

By advancing *Mammillaria* to Subtribe status and making a new genus to include the species that have a common seed shape, all the confusion and worry that formerly plagued the students of that seemingly heterogeneous horde will be gone forever.

Other characters, of course, are also important, but the generic seed shape is the paramount, the most fundamental, the least subject to change, of all characters. Usually hybridism is indicated if the seeds from a single fruit do not have the sameness of design. Another sign of hybridism, especially in *Platyopuntias*, is that similar plants will have flowers of various shades of colour between the two parental flower colours, which often are red and yellow.

In order to correctly segregate the numerous genera that will be included in Subtribe *Mammillarianae*, one should be a seed specialist, and science demands that photomicrographs to 10x should be published of each generic pattern. To satisfactorily do such a work requires a one-lens reflex camera with extension tubes, as may be had in 35 mm. Exakta and Lieca.

The seeds should be arranged in a series of alternate 5 mm. square mosaics, using 1 mm. cross section paper as the base and background.

The seeds shown in this number of the Journal were arranged on 25 mm. squares, as evidenced by the heavy black borders.

The following is an amendment of Britton & Rose's

Key to Subtribes

Perianth funnelform, salverform, tubular or campanulate ; segments several or many.

Areoles most spine bearing ; joints ribbed, angled or tuberculate, very rarely flat ; mostly terrestial cacti.

Flowers and spines borne at the same areoles.

Several jointed to many jointed cacti, the joints long.

Erect, bushy, arching or diffuse cacti 1. *Cereanae.*

Vine-like cacti with aerial roots	2. *Hylocereanae.*
One-jointed to many-jointed cacti, the joints usually short, often clustered, tuberculate, never ribbed.	
Flowers regular, always axillary, from between old or new tubercles	3. *Mammillarianae.*
Joints ribbed, sometimes clustered, rarely tuberculate.	
Flowers at lateral areoles	4. *Echinocereanae.*
Flowers at central areoles (see *Gymnocalycium*)	5. *Echinocactanae.*
Flowers and spines borne at different areoles ; short, one-jointed cacti.	
Flowering areoles forming a central terminal cephalium	6. *Cactanae.*
Flowering areoles at the base or on the sides of the tubercles	7. *Coryphanthanae.*
Areoles mostly spineless ; joints many, long, flat ;	
Perianths mostly funnelform ; Epiphytic cacti	8. *Epiphyllanae.*
Perianths rotate or nearly so ; segments few ; mostly spineless, epiphytic, slender, many-jointed cacti	9. *Rhipsalidanae.*

The following genera are herewith transferred to Subtribe *Mammillarianae* :

Tubercles not grooved above.	
Flowers axillary.	
Fruit not circumcissile ; tubercles woody ; spines pectinate	1. *Pelecyphora.*
Small, single or clustered cacti.	
Flowers lateral, borne in the axils of old and mature tubercles ; these never grooved above.	
Seeds with a large corky aril	2. *Phellosperma.*
Seeds without a corky aril.	
Flowers large with an elongated tube ; tubercles elongated, flabby	3. *Dolichothele.*
Flowers small, campanulate ; tubercles not flabby	4. *Solisia.*

* "Cacti—by their seeds ye shall know them," Desert Plant Life 12 ; 1941.

As background, it may be said that Mr. Hester has specialised in Cactaceae since 1930, following his fascinating scientific hobby of looking for and finding about four score undescribed species, most of them yet undescribed, these scattered over nine of our westerm states, but largely in Texas, Arizona, New Mexico, Utah, Nevada and California.

He thinks that field work is the only road to a thorough understanding of cacti. That there is no cactacean enigma that diligent field studies plus an enquiring mind and a 10x glass will not unravel.

Mr. Hester likes to think that his cactus hobby is purely scientific—for he peddles no plants. To paraphrase Buick's slogan : " If new species of Cactaceae are found, some of them will be discovered by Hester, but only in the U.S.A."

(We welcome the above contribution, but without further and more direct evidence it can only be accepted as a preliminary approach to Mr. Hester's very interesting studies and we trust that he will continue the work by contributing further explanatory material and will be able to publish seed photographs to substantiate the claims he makes.—Ed.)

Further note from Mr. Hester : More data on the seed pictures prove that they are now 14x ! as the original seeds were arranged on 5 mm. squares—as those picture squares are now 70 mm. in diameter—which means a magnification of 14x.

GLOTTIPHYLLUM

By H. JACOBSEN

The genus *Glottiphyllum* (*Mesembryanthemaceae*) consists of about fifty species and some varieties. Strangely enough, although this genus is above all beautifully and easily flowering, it is unloved in the collections of amateurs. In addition, these plants are easily cultivated, but there lies, probably, the cause why these plants are somewhat repudiated ; they grow exceedingly willingly and also very luxuriantly and, in consequence, become insignificant. In most collections where *Glottiphyllum* are to be found, one seldom finds genuine species, but, more often, very free-growing and, often, not very beautiful hybrids. Scarcely any other genus inclines, in its species, to so strong an inclination to hybridisation. All its species are self-sterile. To obtain seeds it is, therefore, always necessary to have two separate plants of the same species. It calls for two plants grown from seed, individually different, to gain genuine seed of the species. Plants, grown from cuttings of the same plant, only continue the same individuality. When seeds are gathered from a plant which it is not positively known to be from the pollination of two distinct individuals and traced back to true species, it must be reckoned that they are cross products. Such seeds must be destroyed. Under no circumstances should such seeds be propagated under a species name. For instance, it may be mentioned that *Glottiphyllum linguiforme* (L.) N.E. Br., was received by Mr. Taylor, of Southborough, and from this plant some cuttings came to other hands, for example, Dr. N. E. Brown, Professor Schwantes. Possibly, from these plants, through vegetative increase, the species was still further propagated. Unless, in short, no other genuine *G. linguiforme* came to Europe, the harvesting of genuine seed was not possible. Notwithstanding, in every seed list of botanical gardens and of dealers, this " species " is still offered. Subsequent breeding always gives ominous hybrids. Even out of South African gardens I received no genuine seeds. Captain H. J. Dunne Cooke, in London, showed me a newly imported plant, probably seen in Europe for the first time, from which genuine offspring could be obtained.

The genuine species of the genus *Glottiphyllum* are extraordinarily fine. They are low, persistent, high succulent plants with forked branched stems. The leaves are two, more or less oppositely placed, or four or more out of a shoot, in cross formation ; they remain thick. The upper sides of the leaves are swollen with protuberances, usually three or more times longer than wide, in some cases also only a little longer than wide, sloping tongue formation, half-round or completely cylindrical. The leaves of a leaf-pair are completely similar, or dissimilarly long, the leaf apices blunt, more or less outwards bent or, also, pointed, thick, tender fleshed, fresh and shiny green or whitish green or somewhat brownish, in some cases, also, with small transparent dots. Flowers are solitary, from the side, sessile or short stalked, very large, shiny yellow ; only in one case, *G. album* L. Bol., are they white ; they flower in September to January, often also earlier.

Glottiphyllum grow and flower easily and, therefore, are favourites with beginners. But one must not make the mistake of feeding them luxuriantly. Very poor, loam-sandy soil is enough. At best, two-thirds sand and one-third heavy loam, without further nourishment. Replant only every two years. Always keep plants in pots and not planted out, so that watering can be by hand. Cultivate in flat bowls or in pots according to the roots. Only during the months of May to June must plants be moderately watered. Place them in full sun ! Winter in a temperature of not more than 10° Cels (50° F.).

Glottiphyllum come from the Karoo Desert and in Little Namaqualand. Well-cultivated plants frequently show, as do the plants in their natural habitats, wonderful toning in the leaves which, with too much feeding, often disappear.

The following can be recommended :—

G. arrectum N.E. Br., with half-round, stiff-apexed leaves, flowers 4 cm. long, gold-yellow.

G. difforme (Haw.) N.E. Br., interesting species with numerous slender tongue-like leaves, the apex being a tooth-like fleshy elevation ; flowers yellow.

G. fragrans (S.D.) Schwant., striking species with sloping tongue-like, very thick leaves. The flower measures 8—10 cm. (!) in length, shining gold-yellow and fragrant. A rare, fine species.

G. grandiflorum (Haw.) N.E. Br., also with wide fleshy leaves and 9—10 c.m, large, yellow flowers.

G. linguiforme (L.) N.E. Br., rare and beautiful species with leaves in rows of two opposite, sloping tongue formation. The flowers are stalked, 5—7 cm. long, gold-yellow.

G. Neilii N.E. Br., leaves in rows of two opposite, very fleshy, mostly different in length, beautiful, opal-grey green, in a sunny place often reddish coloured. Flowers 9—10 cm. long, yellow.

G. Nelii Schwant., very compact species with light green, roundish leaves ; flowers 4 cm. long, gold-yellow.

G. regium N.E. Br., peculiar plant with upper sides flat, below round leaves ; flowers 4 cm. long, stalked, yellow.

FLOWERS OF THE LITTLE KARROO

By the Hon. Mrs. RYDER

(Reprinted by permission of the Royal Horticultural Society from their Journal, October, 1935, at the suggestion of Captain H. J. Dunne Cooke. Our fellow member, the Hon. Mrs. Ryder, the author, has also given her permission).

The Little Karroo, or Southern Karroo, lies to the east of Cape Town and north of the mountains which divide it from the coastal belt with its luxuriant vegetation and immense flora, the result of a wonderful climate and soft, damp mists from the sea.

Heaths, Orchids, Irids, Proteaceous plants of all sorts grow in the coastal belt, *Pelargoniums*, Everlastings and Daisies, such as Arctotis and Gazanias—an endless list of most lovely flowers which one would love to grow, but which are not hardy in our climate. I believe, though, there are many we could grow with a little care and more knowledge as to their cultivation, and also, most important of all, by raising them from seed and not attempting wild imported plants. Plants are usually collected hastily in flower and dry out completely in a short time. By raising them from seed most plants come naturally to our flowering season, which is the opposite of that in South Africa.

Thus, Watsonia Beatricis and its many hybrids flower with me in July and August and in South Africa in January and February.

May I here point out that Watsonias are just as hardy as Montbretias if not planted out in the open as seedlings (they should be two years old from seed) and if given a damp root run in full sun. Very few species grow in very dry places and most Watsonias should do well under the same conditions as Iris Kaempferi.

Some Watsonia sp. are found in really marshy ground and some in running streams, such as Watsonia Galpinii. The late summer species are far the hardiest. Watsonia Ardernei, the beautiful white variety, is the least hardy, though most commonly grown in this country. It blooms so early in June that it is liable to be cut down by May frosts, and also it does not carry its dead leaves in quantity through the winter like many other species do. These dead leaves protect the young growths, and should on no account be cleared away.

These remarks are outside the title of this talk, "The Flowers of the Little Karroo," but may be of interest to some who are not so attracted to the succulent growth of the Karroos, Great and Little. Here the conditions are so different, so arid and dry, that one wonders how any plant survives. It is very hot in summer and very cold in parts in winter, but always with a dry atmosphere and only occasional very heavy rains, mostly thunderstorms.

We could grow most succulents out-of-doors if it were not for the damp. Wet kills—not cold.

Once we have left the coastal belt and risen by one of the magnificent but terrifying passes over the mountains that guard the Little Karroo, the scene changes entirely. Last November we took the Tradouw Pass, about 14 miles from Swellendam, as our gateway to the Little Karroo.

The rains had been very severe, and the Garcia Pass coming up from Riversdale had been closed owing to washaways on the road, a bridge having been carried away and all communication on that side was cut off for some time.

The Tradouw is very beautiful all the way up and barren and lonely at the top, though there is one dwelling house built there.

The road descends easily on the other side to Barrydale, and already we were in the Little Karroo.

At the foot of some rocks we found *Aloe ciliaris*, and further down, just before entering the dorp, we found a *Gibbaeum* or *Mentocalyx velutina*, the small form growing near slabs of rock, but very much nibbled by goats.

Beyond Barrydale there is a rather bleak, uninteresting road, steep and twisty in parts for a few miles, and then suddenly we turned a corner and came on to a veritable riot of colour—the Little Karroo in full bloom owing to the heavy rains which had prevented our taking the other route. I had never seen it in flower, and it was an amazing sight.

We looked down on to a tumbled land of hills and kopjes and rocks red in colour as in Devonshire, with here and there a white kopje standing out, and everywhere flowers. Masses of deep purple bushes, like a very glorious Scotch Bell Heather, of *Lampranthus Haworthii* in the distance, and nearer to the road, *Mesembryanthemums* in red, yellow, orange, lilac and pink, and large bushes of pure white, the whole scene framed by the beautiful South African mountains which one never tires of, they are so wonderful and so varied, and yet always a part of the scenery in Cape Province.

Ruschia approximata and *R. impressa* grew there, and the latter made rivers of pink flowers in the mud by the wayside.

Delosperma delicatulum was another lovely *Mesembryanthemum*.

Once I thought we had really found a sky blue *Mesembryanthemum*, but when we got up to it I found it was pale lilac, and the blue effect was caused by the brilliant sun.

Aptosisimum depressum grew in patches of brilliant gentian blue, striking a violent contrast among the *Mesembryanthemums*. We were really out to find the rarer species of this great family and they grew chiefly on the patches of white stones, sometimes covering several acres and sometimes only quite small areas.

Gibbaeum pubescens grows in very large and numerous patches, and seemed to me to have increased considerably since last I searched for it. With it grew *Euphorbia Susannae*, *Anacampseros papyracea* and the woody-rooted *Pelargonium carnosum*, with small flowers and fern-like leaves.

The most interesting road leads to Riversdale from Barrydale, and here we found much *Gibbaeum molle* growing in yellow gravel and hard to find, as its little apple-like growths seem to imitate the little stones it grows among, either red, green, brown or yellow. Once, in a dry season, when we had been hunting for them for some time and finally subsided exhausted to eat our lunch, we discovered hundreds all round us, embedded in the gravel.

With them grew *Crassula columnaris*, the bun *Crassula*, as we called it, with very pretty white, sweet-smelling flowers. It is hard to keep going at home, being a biennial.

Some way on nearer Riversdale we came to a range of kopjes covered with white stones, glaring white, and here we found *Gibbaeum album* with both white and pink flowers. It is a lovely *Gibbaeum*, though quite hard to see among the stones. Above it beautiful pinky-grey clumps of *Argeta petrensis* with deep pink flowers caught our eyes. Surely this is the neatest and prettiest of all *Mesembryanthemums* in the wild. It is so tight and close in its compact growth. At home it gets rather loose and straggly, but it is more symmetrical in its wild state.

The large *Gibbaeum velutinum*, also called *Mentocalyx Muirii*, grew near the *Gibbaeum album*. It was in good growth and very handsome and velvety.

A little way on we stepped out of the car to find masses of the famous *Muiria Hortenseae* by the roadside, and almost on the road itself. There was plenty of it, and it seemed to me to have increased, as *Gibbaeum pubescens* had done, since I last saw it. It was not in flower and seed was not ripe, which was disappointing.

I looked with great care for the hybrid between it and *Gibbaeum album* which occurs occasionally where the two colonies of plants are close together. I had seen this hybrid in Dr. Luckhoff's garden and also in the Stellenbosch University Gardens. After a most intensive search I found one only.

Muiria Hortenseae grew like little potatoes stuck up on end in circles of five or six, and sometimes the plants were packed together in quite dense masses, but always among fairly large white stones. The two leaves are so welded together that there is no dividing line, and the flowers have literally to burst through the little pale green velvet lump which is the plant. It does not keep its character in cultivation, as it is apt to get swollen and deformed and rarely flowers.

Not far from the *Muiria* we saw flowers of *Cotyledon cacalioides*, bright buttercup-yellow, and very beautiful among the surrounding greys.

Another interesting drive is from Riversdale over the Garcia Pass through Adam's Kraal to Van Wycksdorp, and round under the shadow of the mountains back to Riversdale through the same Pass.

We found the woolly *Cotyledon heterophylla*, which is rare, on this road ; also *Trichocaulon piliferum*, locally called Garp.

Aloe variegata, so like a partridge's wing, is found in plenty in this locality.

There is a wonderful spot where *Gibbaeum pubescens* grows magnificently in huge cushions on white velvet fingers, so soft and downy.

Euphorbia multiceps, in cone-shaped masses of little growths, one above the other till a real little pyramid is formed, grew near it.

Rimaria Heathii is often met with, but always catches the eye as it is so smooth and round, and such a lovely pale grey-green in colour. The major form grows near Van Wycksdorp, but we did not find it there, though we did see it later near Ladismith.

Gibbaeum geminum grew very freely, large straggling, creeping plants like a small *Gibbaeum pubescens*, but not such a lovely colour or of such neat growth.

After Van Wycksdorp, we stopped to hunt for *Gibbaeum dispar*, " G. despair," as Mrs. Ferguson, of Riversdale, called it, as it is so hard to find. We found a few in slaty terraces near the dorp, and then went on and found a very good new place in similar slaty rock. It grows in the cracks of the stone as do many *Conophytums*. *Conophytum Muirii*, one of the smallest species, is plentiful on the Little Karroo.

Soon after this we left the road and struck across some flat, uninteresting sheep farms, where *Gibbaeum pachypodium* and *G. angulipes* grew in plenty, but we thought them uninteresting and did not collect many, but unfortunately now *G. pachypodium* is much sought after.

We made our way to Calitzdorp via Ladismith, and before running down the Huis River Pass collected *Aloe Muirii* on an ostrich farm belonging to an old Dutch farmer.

The Huis River Pass is short but very steep ; the river bed, full of pink Oleander in full bloom, was very pretty. Above, the *Portulacaria* clouded the rocks with its soft, mist-like flowers, pinky-mauve in colour—a lovely succulent shrub and good for the cattle to eat in droughty seasons.

At Calitzdorp, we found Mr. Blackburn, the station master, most kind and helpful. He gave us most detailed instructions as to finding *Haworthia Maughanii*, and we sallied forth next morning in terrific heat, and after much arduous hunting we succeeded in finding it. On a Saturday afternoon, Mr. Blackburn took us to a wonderful area, right away from the beaten track, to find *Haworthia truncata*, the largest form. It was a hard test for our poor old Hillman, and the roughest road we had been on, but it was well worth it.

In one place, *Rimarias* grow of every size and shape and colour ; they are really just like lovely clouded opals when burnt by the sun, and I only wish we could keep their wonderful colouring in cultivation.

Rhigozum obovatum, a Karroid shrub with beautiful clear yellow flowers, was in full bloom.

At last the road got too bad and we had to abandon the car and walk a mile and a half up a dry river bed, with here and there huge clumps of *Trichocaulon flavum*, and a very large leaved *Glottiphyllum*, till we reached a large amphitheatre, all rocks and stones, surrounded by hills very arid and dry-looking. Coppery masses of *Haworthia viscosa* grew among the larger stones.

Sunk deep in the ground and covered with smaller stones we found literally thousands of the large *Haworthia truncata* growing in large groups. Three species of *Anacampseros* grew there, also *Rimaria Blackburnii*, called after our kind guide who discovered it.

On the way back to the car *Heurnia Pillansii* and *Crassula barbata* were added to an already very heavy bag.

If you have not already paid your subscription, would you be so good as to send same to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, without delay. It would surprise members how much they would help the Society, not to mention the Treasurer, if subscriptions were paid in promptly. In addition, prompt payments enable the Council to appreciate the financial position so much better and they can plan forward with greater confidence for brighter and better things for members.

REPORTS OF MEETINGS

October 18th, 1949. A. Boarder : The Autumn Show

Mr. Boarder stressed the need for entries from more members, as if there was not some improvement the Society would have to concentrate on one Show only during the year, with table shows at the monthly meetings. The Society was already committed to two Shows in 1950.

Mr. Collings showed some fine water-colour paintings of cacti by Mrs. N. E. L. Reid, of Porthallow, Cornwall. He asked that other artistically-inclined members tried their skill, too.

November 1st, 1949. R. H. West : My First Grafts

The meeting opened with a discussion on a large display of *Lithops*, *Conophytums* and other *Mesembryanthemaceae*. A number were in flower and provided various points of interest, including the action of overhead fluorescent tubular lamps opening the flowers.

Mr. West opened his remarks by justifying grafting for the same reasons as roses which were grafted to obtain larger and better blooms (afterwards it was mentioned that dealers grafted roses to hurry growth and prepare plants quicker for sale), but his object in grafting was to enable him to grow on seedlings to flowering stage stronger and quicker. To illustrate this he showed seedlings from the same sowing in the same pots as grafted plants which showed more rapid progress by grafted seedlings. An interesting experiment in grafting was making diagonal slits in the pads of *Opuntias*, and the inserting branches of leafy cacti, securing them and in a short time they commence growing from their unnatural resting places. Seedlings were easier to graft and if cuts were properly made, they would take in 36—48 hours, adults took a month to establish. *Opuntias* were no good as stocks (members disagreed, but Mr. West insisted that he had had no success with them). It was essential to trim back the skin at the edge of the graft as, otherwise, it tended to grow and push apart scion and stock. After a plant had been grafted and until it was well established, it was advisable to cover the scion and stock with a bell glass or jam jar, to retain the moisture around the plant.

November 29th, 1949. A. Boarder : Wintering your Cacti

The meeting opened with the presentation of the various Cups as a result of the two Shows during 1949. Mr. P. V. Collings won the Lawrence Cup for cacti with 26 points ; Mrs. M. Stillwell won the Theobald Cup for succulents, with 33 points ; Mr. H. N. Judd the Pullen Cup for miniature gardens, and Mr. A. J. Edwards the new Collings Cup for *Euphorbias*, and Mrs. M. Stillwell was awarded the Dunne Cooke engraved glass bowl for the best grown succulents.

Mr. Boarder pointed out that plants kept in houses needed more water than those in cold greenhouses, because of the higher temperature. *Opuntias* could always do with more water than other cacti. Stove houses were not the best for cultivating cacti as they tend to keep the plants growing and prevent their normal rest. Only sufficient heat is needed to keep out the hardest frosts. The majority of cacti stood 4—5 degrees of frost provided they are kept dry. Dampness plus cold is the real danger. See there are no drips from the glass or the roof on to your plants. Plants should not be kept completely dry during the winter, and should be given a drink when the weather is right, but not dull weather. Never soak plants in winter, only just sufficient to keep the fine root hairs alive. Keep plants on gravel so that drainage, when watering, is possible and air gets under the hole in the bottom of the pot. In heated greenhouses you can give more water. Succulents lose leaves when kept too dry, 35—40 degrees at night in the greenhouse is the ideal. Keep this year's seedlings near to whatever heat you have and well away from glass. Do not transplant these seedlings now, wait till the warmer weather. In houses the spare room is best in which to winter your plants. They do not like draughts nor wet feet, however. If you keep your plants in an outside frame, an oil lamp will keep your plants safe, and the soil will provide sufficient moisture. *Mesembryanthemums* with seed pods should have a little water and heat to develop the seeds. Plants need as much light as possible, but when they become frosted keep them shaded and out of the full sun ; better cover them with paper. Brown paper over the plants or inside the glass will keep out 4—5 degrees of frost. Keep thermostats at 40 degrees. Do not water plants when wet, wait till they have completely dried out.

BRANCHES

London. February 7th, 1950, 7 p.m. : Annual General Meeting.
March 21st, 1950, 6 p.m. : W. Denton : Succulents from seed.
April 18th, 1950, 7 p.m. : Covent Garden Succulent Corner (for the exchange of surplus plants between members).

Berks & Bucks. On Sunday, September 18th, the branch had a small Show in Mrs. Stillwell's garden, with nine classes ; Mr. Boarder acted as the judge. There were money prizes to be spent on cacti, and Miss Ash, of Gerrards Cross, sent some small plants as prizes which were much appreciated. Mrs. Jarvis, of West Drayton, presented the branch with a cup which is to be competed for annually for the best seedlings grown in the current year. It was won by Mrs. J. Luty-Wells, of Langley, with some beautiful seedlings which Mr. Boarder said came up to his standard. It was a beautiful afternoon and, after tea, Mr. Boarder gave a very interesting summing-up of the Show. Next year the branch hopes to launch on a larger scale by making it a combined effort with the Royal Windsor Rose Show, which will be held in the grounds of Windsor Castle. Sixty feet of table has been provisionally booked at this Show next June. At the November meeting the members brought their Journals and specimens of *Mammillaria rhodantha*, and a very full discussion took place. At the December meeting the discussion was mainly about watering of plants, and a few seeds were distributed among members who wished to try out Mrs. Stillwell's propagator idea which the Journal hopes to explain in its next number.

West Kent. The first meeting was held on 28th April, 1949, when ten new members were enrolled. During the year 19 new members have joined. During the month of July we staged a non-competitive exhibition stand at the Hayes and District Horticultural Society's Flower Show. We have now arranged for the Hayes and District Horticultural Society to put up a competitive stand for cacti in 1950. Mr. S. Border, of Sidcup, staged a very fine show of cacti at Sidcup during August. Although the results of these shows may not be immediate, we have very nearly doubled the branch membership during our first year. It is possible that other branches might be interested in a little experiment that we propose to carry out during 1950, and that is to give each member a number of seeds which are to be planted all on the same date ; they will be all of the same species and will, naturally, be grown under widely different conditions, since some of us believe in shading young seedlings from direct sunlight, some believe in as much fresh air as we can give them, others believe in as much heat, etc., etc. From time to time during the next two years they will be brought along for comparison, and it is hoped that in this way we shall find out a little more about raising cacti from seed.

Thanks are expressed to Mesdames D. H. Preist, J. M. Hoather, D. M. Poore and Messrs. K. H. Walden, G. T. Reynolds, W. Denton, S. Border and W. H. Wilde for their kind assistance during the year. Indeed, the success of a local branch depends on all its members pulling together.

We are hoping to be able to fix the dates of our meetings for the coming year well in advance, so that we can insert them in the next number of the Journal, together with the time and address of our meeting place, when we shall be pleased to welcome any members of the Society.

North Kent. Unfortunately, no written report has been received, but that is not to say the branch is moribund. It has been active throughout the year and successful results have been achieved.

The idea of this page is to give the members an idea of the value and advantage of having a local branch in their own area. It is surprising what good can come from a few members getting together. They get to know each other, they can discuss, with mutual advantage, our plants and get to know more about them. The activities of the branch draws and attracts other collectors of cacti in the district and the membership of the branch and the Society increases in consequence. The co-operation of the members of the branch frequently enables a local exhibit to be made in conjunction with the Flower Show, and members get a great deal of interest in showing their plants, and it frequently happens that the members find their exhibits "steal the Show."

The names and addresses of the secretaries of the branches will be found on the inside **front cover** of this number of the Journal.

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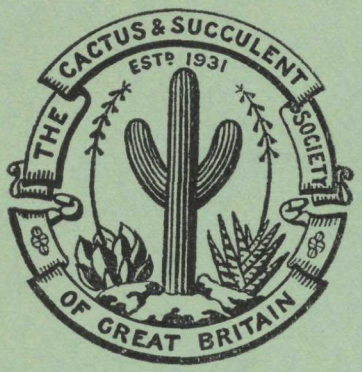

Meeting Place : New Hall, Royal Horticultural Society, Vincent Square, London, S.W.1.

Subscription : 21/- per annum

SOCIETY NEWS

1950

May 2nd, 7 p.m.	A. Boarder : Practical Potting Demonstration.
June 13th, 7 p.m.	Brains Trust : Question Master : A. J. Edwards. Panel : A. Boarder, P. V. Collings, W. Denton, K. H. Walden
July 11th, 7 p.m.	Summer Show. Discussion on the Exhibition
July 16th :	Visit to K. W. Harle's Nursery

Branches

Berks & Bucks : *Secretary* : Mrs. M. Stillwell, 18 St. Andrews Crescent, Windsor.

West Kent : *Secretary* : J. H. Grimshaw, 67 Masons Hill, Bromley, Kent.

North Kent : *Secretary* : S. F. Milton, 75 Portland Avenue, Gravesend.

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EDITORIAL

It is with the deepest regret that we have to report the passing of Professor Dr. Gert Cornelis Nel on the 16th February, 1950, after a short illness. He had previously undergone an operation, but had almost resumed his normal life and was walking about, but was suddenly taken ill again and passed away.

He has long been known to us in this country as an erudite student of South African succulents and his recent book "*Lithops*," will, if nothing else, keep him always with us. We are sure that all our members will join with us in our condolences and sympathy with his widow, his son and his two daughters.

Professor Nel was born at Greytown, Natal, and he took his B.A. at the old Victoria College, Stellenbosch, and then he went to Germany, studying at the Halle University and later obtained his botany doctorate at the University of Berlin. He then returned to South Africa and began an eventful and extremely useful life there. The botanic gardens at Stellenbosch, South Africa, were established at his instigation and he finally became an active member of the Stellenbosch University Senate.

As an educationalist, he performed valuable services on the Joint Matriculation Board, where he acted as Moderator for all the biology and botany examinations in South Africa. He wrote many school textbooks on biology and published the first Senior Certificate manual for this subject.

Professor Nel was a pioneer in using Afrikaans as a medium for instruction in botany in South African Universities and supplied the first list of Afrikaans botanical terms to the Afrikaans dictionary, with which he was connected as a botany reviser. Recently a botanical dictionary in Afrikaans, by him, was published in Belgium.

In addition to "*Lithops*" his name will remain with us for all time as many plants were named in his honour and, as is well known to us, he named and described a considerable number of South African succulents.

A knowledgeable man, an enthusiast, one we could ill afford to lose, but his work will prevail and remain with us for all time.

CULTURAL NOTES

By A. BOARDER

This Journal should reach you at the most interesting time of the year as far as our plants are concerned. We shall all be looking forward with as much patience as we can command to the flowering of our cacti and no doubt hope for more and better flowers this coming season.

As I have recommended before, it is beneficial to re-pot all plants each year and the time to do this will depend a great deal on where the plants are kept. I had re-potted all my plants before January was over, but I do not advise anyone to do this task as early in the year if the plants are in an unheated greenhouse or in a living room. The warmer and brighter the place where the plants are kept, then the earlier in the year can the plants be re-potted. For the average grower, I think that late March or early April is a good time to start re-potting, but, of course, a lot will depend on the conditions. I have dealt with the actual methods of re-potting on previous occasions and so do not intend to deal with it as fully here. There is one thing though which I do emphasize and that is, do not re-pot a plant into ordinary potting soil if the plant does not appear to have healthy roots. Where this is found to be the case I do most strongly advise that the plant is first placed in a pot or pan in which there is a good depth of either Vermiculite or sharp sand so that the plant can make fresh roots before it is properly potted up. To place a plant in potting soil and start watering it, is the quickest way to lose such a plant.

If you have plants in your collection which are mature ones and are as large as you require or, shall we say, as large as your house will accommodate, then, perhaps, it will be as well if you do not re-pot as often as once a year. In this case the question of providing some form of fertiliser, in order to provide some extra nourishment, becomes apparent. I am always rather reluctant to advise the use of fertilisers to beginners. I use them very little myself as I am fairly well satisfied with the results which I can obtain without resorting to these methods. I have some four year old *Mammillarias* which are now in five-inch pots and are as large as I really want them and, therefore, there is not much object in trying to force them on to greater growth. I realise, though, that several kinds may benefit from an occasional liquid feed. The trouble is that, as a rule, if some people start using fertilisers they do not know when to stop and cannot keep to the quantities which are recommended by the dealers. These fertilisers are so strong that, if they are used in too great a strength, they will do more harm than good. If you do intend to try this system, as an experiment, then see that you do not exceed the doses by the least bit as, otherwise, you may kill the roots and the plant. Cacti are not as easy to deal with as ordinary plants which have leaves to signal immediately to you, both when they may be in need of a feed and, also, when they have had too much. A good gardener has only to glance down a row of pots containing Chrysanthemums to tell, in a moment, whether any particular plant needs a feed. By the very nature of the succulents, it is not possible to be able to tell when any plant requires a feed. In these circumstances, you must be very careful how you use liquid feeds.

Some plants which are growing well and are well budded for flower will, no doubt, benefit by an occasional feed. It is absolutely no use feeding any plant unless it is healthy and growing. To feed a sickly plant is of no use whatever and you will never make a sickly plant grow by feeding it.

Plants which have been potted into the John Innes Potting Compost are not intended to remain in this mixture for very long without a liquid feed. A little liquid fertiliser occasionally is intended to help the growth of the plants. The formula recommended by the John Innes Institute is a quick acting fertiliser with approximately three parts nitrogen, one part phosphoric acid and one part potash. This mixture can be purchased from a seedsman and the method of application is as follows : Use a half to one ounce of the mixture to a gallon of water, soft for preference, and then water the plants with the solution once in about ten days. Always remember that you must only feed this to healthy growing plants and not to all and sundry in the greenhouse. It is advisable to slightly damp the surface of the soil with ordinary water before using the liquid feed. In between times, you must water with ordinary water. See that the mixture is well stirred up and mostly dissolved before application. This solution is quite sufficient to keep a plant healthy and growing and, therefore, if you do not wish to re-pot a particular plant, then you may like to try the above method.

In my article in the January Journal, I gave full descriptions for seed raising and now I will deal with the subsequent treatment of the seedlings. This question of transplanting is always cropping up and I can only repeat what I have said before and that is that so much depends on how the seedlings are progressing and whether the soil appears healthy. I have recently transplanted some seedlings which have been in the seed pan for nearly a year and all of them were so packed together that their sides were square instead of round, but, when carefully separated and replanted, they soon made good progress. The soil into which these seedlings should be placed does not need to be as coarse as that which I recommend for adult plants. I have found that the best medium for

transplanting seedlings into is the ordinary John Innes Seed Compost to which has been added, to each bushel, one and a half ounce of hoof and horn grist and three quarters of an ounce of sulphate of potash, well mixed in. The actual mixture now is composed of : two parts (by bulk) of good fibrous loam, one part peat and one part sharp sand. To this is added, to each bushel, preferably mixed with the sand first, three quarters of an ounce ground chalk or limestone, one and a half ounce superphosphate, one and a half ounce hoof and horn grist and three quarters of an ounce sulphate of potash. This mixture I find to be very good for young seedlings. Once the seedlings are growing well they can be watered occasionally with the liquid feed as previously recommended. If the seedlings are small, then they must have some shade from strong sunshine until they develop strong enough spines to provide some protection.

I have sown over two hundred kinds of cactus seeds this year and did not cover any of the seeds, no matter how large they were. I have found that germination has been exceptionally good. There were several kinds of *Astrophytum* seeds and these are fairly large and yet they have all germinated well. You can easily prove the truth of this by trying a few seeds sprinkled on the surface and then cover some with a little soil. I think that you are almost sure to find that the seeds sown on the surface will germinate the better.

Be careful with seeds such as *Lithops* as these must not have a piece of glass as a close cover as these kinds are very prone to damp off and must always have plenty of fresh air and a fairly dry atmosphere. I have said on other occasions that I always water from above and do not stand the pots in water. I do this mostly as I have too many to dip in individually, but also because the dipping of a pot into water may cause most of the fertilisers in the soil to be washed out of the drainage hole.

Since my broadcast, I have had many enquiries as to why certain plants have not flowered. On making further enquiries, I have found that the reason why many people get little or no flowers is because they have the idea that they are desert plants and require little or no water. Perhaps books have been read which repeat the old fallacies that the plants will not flower unless they are pot-bound, that there must be a third of the pot drainage and they must not be re-potted. No wonder people give up growing these plants because they do not flower. Years ago some one wrote these fallacies and it seems that nearly every writer since then has just copied the same things down and has never tried out by experiments as to the best methods for growing these plants. I imagine that no group of plants grown in this country are so little understood by the large majority of people. I have seen a few articles on cacti in the popular press lately and the same old nonsense is being repeated. If some of these writers were as good with the spade and trowel as they are with the pen it would be better for all concerned.

I promised to report on the progress of my plants in my new greenhouse. Well, I am glad to say that the plants are doing well and I hope to have many flowers this year. The new house is filling up and I am now busy making concrete troughs to stand on the brick wall on each side of the path in the greenhouse. These troughs are fourteen inches long and four and a quarter inches wide ; with a depth of three inches they are ideal for young seedlings. I have found a spot of trouble with the soil which packs the area between the walls on which the gravel lies. Worms work their way up into the pots and also some bindweed comes up too. At present, I am anticipating concreting over all and then covering this with gravel,.

You should not water *Lithops* or *Conophytums* now, but most of the other plants will be needing more water from now on. Remember that the plants will not grow without water, but watch how you do this. My golden rule is, water well when you are at it and then do not water again until they are quite dry. If a plant pot becomes very dry, then a slight watering, say to the top of the pot, can never damp all the soil in that particular pot. Make an experiment yourself by taking a pot and filling it with potting soil. Then water with about two tablespoonfuls of water and leave for five minutes. The water will have apparently soaked into the soil, but if you lift up the pot you will find that most of the water will have run clean out of the drainage hole. Now stir up the surface of the soil in the pot and you will find that just underneath it is bone dry. This will give you some idea of the difficulty of watering a plant in a pot. Thousands of plants in pots in greenhouses never get the centre of the ball of soil even damp. How then can the plants be expected to grow ?

See that the plants get plenty of fresh air from now on, and do not shade the greenhouse glass for any of the adult plants as long as you are able to open the windows and doors of the greenhouse on all very sunny days. Examine the water tank in the greenhouse and give it a thorough cleansing. Much trouble can be saved by seeing that the water is not polluted in any way as algae which forms in the water will cause a green scum to form on the top of the soil in the pots, which, subsequently, forms a crust. A weekly watering with a weak solution of permanganate of potash will help to keep the soil in the seed pans sweet and does tend to prevent damping off disease.

MAGDALENA ISLAND

By HOWARD E. GATES

During mid-morning a chance glance inland from Medano Amarillo revealed a distant cloud of dust. As the dust grew closer, the rattling of fenders announced that the mail man was drawing nigh on his fortnightly trip to the village on Magdalena Island. During his journey over the hundred and seventy miles of twin ruts that are called the road to La Paz, he had delivered the mail to possibly a score of scattered ranches. These ranches consist of a house, an open hand-dug well, a corral for cattle and, possibly, a tiny fenced garden to produce maize, squash, tomatoes and melons. Every bit of water for these truck gardens, as well as the varying numbers of cattle which roam the brush in search of forage, must be drawn from the wells by primitive methods. Often these wells are more than a hundred feet deep. The most advanced method is the use of a large leather bucket attached to a rawhide rope, with the other end fastened to the saddle of a donkey. The animal draws this rope over a wheel placed above the well. He knows just how far to go and cannot be driven farther. Two persons are necessary. One to tip the bucket when it reaches the surface and the other to keep the donkey in motion. The ranch houses are made out of the materials easily obtainable in the native growth as there is no timber suitable for sawing into lumber. The floors are earthen, the walls made of vertical poles lashed together, or of mats woven from the branches of trees. The roofs are of palm leaf thatch. Because of the fire hazard, cooking is usually done on a table covered with earth in a small separate structure. A few stones form the supports for pots and pans over the structure. Dry maize, rock salt, and dried meats are ground by hand on a stone mortar. Coffee is purchased green, roasted until it is black and then ground by hand. An Englishman probably would not give £5 for the whole establishment, less the cattle.

But let's get back to our mail man. After a brisk bargaining with him, he consented to take us across to the village on Magdalena Island. We ferried the mail and our supplies out to his anchored motor boat and stowed them away for the twenty mile trip across the bay. Part way over, we noticed a heavy dark line in the air ahead of us. As we approached, it bent away, to break and re-form behind us. It was a broad band of sea birds going from their roosting places on the mangrove trees in the lagoons to the north to their feeding places and back again. It is a never ending pageant for this is one of the world's great bird refuges.

As we approached the village on Magdalena Island, we noted that it is different from all the other Mexican villages we had seen, for it is almost entirely of frame construction. These wooden buildings were a reminder that this was once the headquarters of an English concessionaire engaged in the collecting of orchilla lichens from the trees of the plain for the purpose of making dyes. The discovery of synthetic dyes put the concession out of business before it was fairly started.

Since there was no pier, we anchored offshore and landed in a row boat. Our first duty was to call upon the officials at the custom house, show them our papers with their multiple rubber stamp impressions and obtain a few more such impressions. Such calls were not officially necessary, but it is always well to award the local officials these courtesies.

Our first explorations were to the north of the village on a bench between the bay and the sea, known as Mesa Santa Maria. On this mesa we found two types of endemic clustering cactus, each with a purplish or plum coloured cast. One was low and composed of very many short branches. It was *Echinocereus Barthelowanus*, found only on this and neighbouring islands. The branches of *E. Barthelowanus* are attached to each other with such fragile connections that a compact cluster will fall to pieces in handling. This fact led one experienced field collector to think that these clusters were groups of seedlings rather than single plants. It has never been my good fortune to see this plant in flower. Possibly I have not missed much as it must be the most insignificant of all the *Echinocereus* flowers. It is described as being only 10-12 mm. long. Apparently this is the hardest of all to grow under cultivation and I know of no living plants now in collections.

The other purplish clustering plant belonged to that strange gigantic group of the *Mammillaria* family known as *Cochemiea*. We found that all its acicular spines were straight, so it was easily identified as *C. Halei*. All the

other four known species have strongly hooked central spines. The one and a half to two inch branches rose to a height of eighteen inches before they became so heavy they toppled to the ground and grew some more. Single plants, whose branches do not root upon contact with the ground, may be several feet across and six or eight feet long. The scarlet flowers arise from the axils of the tubercles, near the tips of the branches, and may form a complete ring. The flowers are tubular with recurved outer perianth segments and an irregularly oblique limb. These features make them look closer to the Christmas or Rat Tail Cactus than anything else. After flowering, broad scarlet fruits develop and entirely fill the axillary spaces. *C. Halei* is difficult to grow under cultivation and few domesticated specimens are known. All of the *Cochemieas* have a corky flesh which makes them difficult to graft. C. *Poselgeri* and *setispina*, from other portions of Lower California, are the easiest to grow and, probably, the most attractive.

Scattered over the mesa we saw both living and dead lances reminding us of the fabulous Don Quixote. They were the flower stalks of *Agave margaritae*. This dwarf reaches blooming size when barely a foot across and it hardly seems possible that such a plant could send up a ten foot inflorescence. From the upper third of the stalks, branches, bearing clusters of yellow flowers, arise at a very acute angle in sharp contrast to the more spreading habit of most *Agaves*. The green leaves are short and compact, but surprisingly well armed with stout hooked marginal teeth and a blunt spine. The curious should always be careful about shaking the inflorescence of an *Agave*. The flowers produce immense quantities of nectar which will descend in a heavy shower upon the slightest of provocations.

As we wandered about on Mesa Santa Maria, we could not keep from treading on bleached white snail shells. A distant bush would appear to be covered with flowers, but investigation would show it to be loaded with aestivating snails. Fortunately, there is no agriculture on Magdalena Island or these land snails would be a pest of the highest order.

Wedged in between the rocks of the hills bordering the mesa, were occasional clusters of *Dudleya albiflora*. In many respects the *Dudleyas* are similar to *Echeverias* and some botanists still lump them together. The easiest method of making a snap determination is that *Echeveria* leaves appear to be stuck into the stem, while the leaf bases of *Dudleyas* clasp the stem. Various *Dudleyas* are found over a fifteen hundred to two thousand mile stretch from the mouth of the Columbia River to the extreme tip of Lower California, reaching their greatest abundance, both in variety and number, in northern Lower California. In the main, these are coastal plants, though a few thin leaved species are found in the inland deserts. *Echeverias* are only found on the Mexican mainland and never on the peninsula of Lower California. The reverse situation applies to the *Dudleyas*. *D. albiflora* forms clusters of rosettes, composed of stiff and sharply pointed leaves. The racemes of white flowers are borne on rather slender stems. *D. albiflora* was considered to be the only white flowered *Dudleya* until *D. Gatesii* was discovered in central Lower California. Since then one or two more have been uncovered. The usual flower colour of *Dudleyas* is orange, with some species producing pink or even red flowers.

On our way back to the village, we crossed a ravine containing another strange sprawling plant of a purplish tint. Our first big question was—" What is it ? " for we had never seen anything like it. The branches had definite ribs like a *Cereus*, yet the spine covered fruits had a deep umbilicus like some *Opuntias*. We did not have time to settle the question on the spot, but dug in for specimens. The hard central cylinder of the branches was more than a match for our tools and had to be chewed off rather than cut. Every time a branch would swing round, the spines would grab hold and hang on. I never had such a painful experience in collecting any kind of a cactus. I still consider the specimens in my garden the sharpest spined things on the place and the spines are barbed so that they do not slip out again. After growing some of these specimens in California, the flowers were observed to be greenish yellow on the first day, changing through pink to rose on following days. Based on our collections, Edgar Baxter published the description of *Grusonia santa maria* (Cac. and Suc. Jour. of Am. Vol. VI, p. 60). It is now called *Opuntia santa maria* as the only thing that separates *Grusonia* from *Opuntia* is the absence of glochids. *Grusonia Bradtiana* is the only one of the several ribbed *Cylindropuntias* that does not have glochids.

Behind the village, rose the ridge forming the backbone of the southern end of Magdalena Island. Naturally we must climb it to see what we could find. The summit was almost knife-edged and the outer slope to the breaking surf was so steep and covered with loose rock, we did not dare to venture upon it. We did not find anything of value to pay us for our efforts.

The ice plant, *Cryophytum crystallinum*, was everywhere. In protected and fertile spots it covered several square feet to the plant. In sunny and fully exposed places, they were dwarfed to barely the same number of inches. The crystals upon the ruddy leaves were a glistening sight in the sun, but very slippery footing.

The few specimens of *Pachycereus Pringlei* found on the island, were sorry, decrepit specimens compared to the giants on the peninsula, owing to their continuous battle with the elements.

After a night of gently rocking to sleep in the mail boat, we prevailed upon the mail man to take us southerly to Santa Margarita Island, where we made two landings. On Margarita we found another dwarf *Agave* burdened with the name of *A. connochaetodon*, which means Gnu-toothed. Though I am not on speaking terms with the doughty Gnu, I'm sorry for him if his teeth are as prominent and irregularly shaped as those on this quaint blue leaved *Agave*. The plants were a little larger than the green leaved *A. margaritae*. It too would make a good house plant until its ten to twelve foot inflorescence began to strike the ceiling. Neither of these *Agaves* is known to occur on the mainland of the peninsula.

On both islands are varying types of *Opuntia pycnantha* which grow in large clusters to a height of several feet. The oval pads usually grow singly upon one another in a vertical plane instead of alternating planes, as is often the case with *Platyopuntias*. On the outer edges of the plants were chains of these pads ascending on an angle with the ground. As the chains of pads grew too heavy, they sagged towards the ground and, as each succeeding pad touched the soil, it took root on the lower edge. There were abundant glochids and the numerous, rather weak spines were more than an inch long. In the typical form, the spines as well as the flowers, are yellow. In other types, the spines are reddish brown and the flowers darker coloured. A dark spined form has been described as *Opuntia margaritana* (Coulter). *O. pycnantha* is of easy culture. The flowering pad in the accompanying illustration is from a photograph made by George Lindsay in my garden.

Other *Opuntias* were the *Cylindropuntias cholla* and *prolifera*, both arborescent to several feet, with proliferous fruits hanging like strings of beads. *O. cholla* had yellow spines and pink flowers, while *C. prolifera* had reddish brown spines and red flowers.

On both islands were occasional clumps of *Machaerocereus gummosus*, *Wilcoxia striata*, numerous small reddish clusters of *Mammillaria dioica*, lichen covered *Fouqieria Diguettii* and leafy *Jatrophas*.

Occasionally we found the partially exposed tubers of what the natives call " Melon de Coyote." Coyote is the native name for the American wild dog which often looks like a German police dog, but far excels the German in musical ability. However, this native name for the plant merely means "Wild Melon." From the tuber grew an annual shrubby growth which produced tiny flowers of the Passiflora group, followed by oval scarlet fruits, the size of a hen's egg, which were translucent with the setting sun behind them.

Possibly the strangest plant of all was a primrose, Xylonagra arborea. This made a slenderly branched bush with small leaves and long scarlet flowers, resembling a small flowered Fuchsia that we call the Fairy Fuchsia. For a primrose, this plant was even stranger below ground than it was above. The root was fleshy, without fibres, one and a half or two inches thick and several feet long. Primroses of the annual, large flowered evening type are very plentiful throughout Lower California and its islands. The flowers of these are white, yellow or pink.

We had an extra day on Margarita Island to re-check our discoveries as the wife of a prominent merchant died. The mail man delayed his sailing a day to attend the funeral, but even this extra day was not enough to satisfy us.

Many know Mr. Boarder only through the pages of the Journal. We reproduce a photograph of him puplished by the " Middlesex and County Gazette." Mr. Boarder recently gave a talk on cacti at the Manor Senior School, Ruislip, being invited by the gardening master, to a number of 14-year-old boys. They were so interested that the master said he had never known them so quiet before ! They asked many intelligent questions and were keen to try to raise seeds which Mr. Boarder promised to give them.

On Sunday, July 16th, there is an all day coach excursion to the nurseries of Mr. K. W. Harle at Lower Basildon near Reading. The trip last year was a success and members have called for a repeat. The coach leaves Victoria Coaching Station 10.30 a.m., lunch at Pangbourne, then on to Mr. Harle's, tea at Pangbourne and then back to Victoria. The cost, inclusive of coach, lunch and tea is 20/- and members intending to join the party should send 20/- to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, at once. The coach only holds 33 and it is advisable to book early as only one coach is available. Mr. P. V. Collings will be in charge of the party.

ANÁHUAC

Succulence, the essentiality of plants

By J. J. VERBEEK WOLTHUYS

" —And he repeated softly to himself, the name of this landscape—' Anáhuac.'

" It filled him with a great sadness—this flat, treeless country where the only living things were the *Agaves*, only now and then interspersed with tall, seeming struggling Cactuses ; all plants without foliage, without twigs, stripped and limited to the material, the essentiality of plants.

" Just as if the ground permitted no luxury, no concessions, and nothing could here make a compromise."

The above cited words occur in a book by Albert Helman, " Het vergeten gezicht," published by Nijgh and van Ditmar, Rotterdam, and they inspired me with what I intend to tell you now.

Perhaps it is necessary that I start with a short explanation, namely, that Anáhuac is a word in the language of the ancient inhabitants of Mexico, the Aztecs. It is nearly a synonym of the name of the Mexican Republic, more particularly the Highlands of Mexico, the very hot part of the said Republic, the " tierra caliente."

That is Anáhuac, the recreator, the transformer who turned common foliage plants into succulents.

The man looked over an endless, glowing, dry landscape where only *Agaves* and Cactuses could live their lives between the rocks and he realised that other plants could not grow there, and he discovered the plants that survived the heat and the drought were all deprived of leaves, twigs, and anything that should appertain to a common vegetable. That is the tale in Anáhuac and also in the Karoo of South Africa, which is also a plateau or highland.

Dr. Rud. Marloth completed this with a description of Karoo plants about which he wrote, " People see here dwarfish " bossies " (plants), or rather woody skeletons, that look like old brooms—brown, gray or yellow, just as the surrounding ground and the rocks. Everything looks burnt, seared and apparently dead. Many have thorns and they always grow at a distance from one another and if they have leaves, these are thick (succulent) and not green, but gray or sallow, just like ash coloured branches or sprouts."

And so it is, also, in many other parts of the world that are called deserts. Each of them, however, has very abundant sunshine. Notwithstanding this, Professor Kurt Dinter says, " After the tiresomeness of the seas, the desert is, for me, the most dreadful appearance-form on earth and only, for me, has a right of existence as a producer of the most sublime accommodation forms."

So much for the circumstances under which succulents are living and the circumstances that lead to their outward shape. But now for Mr. Helman's discovery—that the succulents have the essentiality of plants. It appears to me that he has given, in a few words, a very acceptable description of those plants, even, in my opinion, a remarkably just one.

Indeed, succulents are reduced to essentiality, to the strictest necessities. They have abandoned almost everything which, in milder climates, produces the charming appearance and the possibility to be able to exist there in juicy floridness of the other children of Flora.

One could ask—is there any certainty that the very well known succulents originated in leafy plants ? And the enquirer would then be obliged to confess that he was not sure of it, in consequence of the lack of fossil proofs. But, if we look at different collections of succulent plants, then there appears a great deal which will help to elucidate, for it is possible, in some plant families, to follow, step by step, the change of common plants to even ultra-succulent forms.

In Europe we can best consider the *Euphorbiaceae*, the Spurge Family. Nearly everywhere in the wild, there are living species of *Euphorbias*, in similar habitats to other plants except for their typical Family and generic characteristics and none of them show the least spur of succulence.

Then we meet in most collections, *Euphorbia splendens* or *E. Bojeri* with woody branches and ordinary leaves, no succulence on the whole. Then follows the genus *Pedilanthus* with little thicker leaves, the first to attain succulence. This increases regularly, manifested either in thicker leaves or in the typical thickening of the stems or branches from which the distinction—leaf or stem succulents—arises, with all kinds of interlocking forms. Those thickened leaves and stems are then provided with a special tissue, for a water store, consisting of cells, who, in combination, form a provision where the plant can store the needed water in times of drought.

Leaf succulents are best indicated by the *Mesembryanthemacaea*, such as *Corpuscularia Lehmannii*, *Delosperma echinatum* or different *Crassulaceae* such as *Sedum Adolphi*, *Sedum pachyphyllum*, *Pachyphytum oviferum*, etc. whereby very thick leaves originate from thin, woody branches. But also the ultra-succulent *Mesembryanthemaceae* such as *Lithops*, *Glottiphyllum*, *Muiria*, etc. are leaf succulents although they have very short, or no branches and it is the same with plants like *Haworthia*, *Gasteria*, *Echeveria* and most of the rosette forming ones. In all of them, the water tissue is found in the leaves, hence their thickness, contrary to the stem succulents, where this tissue is found in the stems and only sparingly in the leaves.

As an example of a stem succulent I would mention *Euphorbia Pfersdorfii* where we meet a stem in the form of a pillar (cactoid or cereiform) with, in the heart of the growing point, nearly rudimentary leaves of 2-3 mm. in length and 1 mm. broad and thick. The series ends in plants like *Euphorbia obesa* where the globular form appears and even the awl-shaped leaves, as to size, disappear and are reduced to real rudiments.

With this we have followed the whole cycle whereby a common leafy plant is reduced to succulence, the essentiality of a plant, though the vegetable can continue its existence and, without being in possession of all the atrophied characteristics, is able to grow properly, to flower and to bear its fruits. In addition, there are other forms that are a combination of small globular parts, such as *Euphorbia globosa*, then the melon-shaped *Euphorbia caput medusae* which produces out of a globular body, long branches that bear little awl shaped leaves and on their terminals the flowers.

This is all the process with *Euphorbias*, but Cactaceae show just the same procession. Compare, for instance, *Euphorbia splendens* with *Pereskia*, *E. Pfersdorfii* with *Cylindropuntia*, *Euphorbia obesa* with *Astrophytum myriostigma*, *Euphorbia globosa* with *Opuntia diademata* and it is evident that drought and heat have reacted the same with *Euphorbiaceae* as with Cactaceae and reached, in both instances, nearly the same results.

There is a name for this phenomenon, parallel adaptation, and this expression is used when plants, out of entirely different Families, growing even in far remote parts of the world, get similar forms when they are excited by similar circumstances. This phenomenon is not only limited to the *Euphorbiaceae* and the Cacti, but with those two it is so very obvious to the eye how great is the power of adaptation of Nature and, moreover, rules by very fixed laws.

Looking a little further, we discover in *Stapelieae* a great resemblance with the stems of some *Cereeanae* and then, as a matter of course, also with some *Euphorbias*. The globular limbs of *Euphorbia globosa* and *Opuntia diademata* are to be found in *Piaranthus parvulus* and *P. globosus* though the chains are shorter. And the Indian genus *Frerea*, belonging to the *Stapelieae*, compares with the succulent leaves of, such as *Pereskiopsis* and some species of *Sedum*.

In order to underline in how great a measure this parallelism is disclosed by the succulents, I give a series of names showing parallel forms in very different families of plants and I believe that it will be possible, without much trouble, to lengthen it.

Euphorbiaceae : *E. cereiformis, cactus, mammillaris, pseudo-cactus, rhipsaloides, stapelioides.*

Stapelieae : *Caralluma mammillaris, Echidnopsis cereiformis, Stapelia cactiformis, S. mammillaris, Trichocaulon cactiforme.*

Compositae : *Kleinia stapeliiformis.*

Crassulaceae : *Urbinia agavoides, Crassula mesembrianthemopsis, C. portulacaria.*

Mesembryanthemacaea : *M. sedoides, aloides.*

Cactaceae : *Anhalonium aloides, Cephalocereus euphorbioides, Hariota mesembrianthemoides, Mammillaria sempervivi, Opuntia stapeliae.*

The Bulletin of the Missouri Botanical Garden, 1937, No. 25 gives a very interesting representation of a threefold case, viz., a *Rhipsalis*, and Orchid (Vanda teres) and *Euphorbia tirucalli*, all of nearly the same shape and not distinguishable if without flowers.

What must we do with all these arresting and remarkable phenomenon ? Let us begin, as succulent lovers, with being happy that they exist and be content with it and, above all things, not overwhelmed. It is no case of chaotic confusion, for there are very plain lines of demarcation between the many instances. We find them in the flowers, fruits and seeds, which indicate to us, with certainty, as to which Family or genus a plant belongs when we have learned to distinguish them. But rather it is pleasing that the phenomenon brings a rich vision of the fine and continually similar operating methods of Nature, who in everything acts according to pre-determined paths.

How did this process evolve ? Was it in a series of years in which the weather became more and more dry and arid, or in a period of centuries ? Or did it happen suddenly ? Who will be able to explain it precisely ? However, there are, after consideration, some more or less clear indications. Personally, I do not believe in a sudden great change, Nature makes no such immense jumps, she works one modification at a time, that means with each mutation as a rule, but one characteristic, so that different mutations extend over a very long time. Nature is cautious and in nearly everything she performs, we discover a quiet, but irresistible continuation on the way to her aim, she even preserves, in latent form, superfluous organs which become rudimentary and can be evolved if such is necessary. I rather believe, therefore, that the process accomplished itself methodically, because if it had taken place suddenly, and then undoubtedly very violently, in my opinion the now known succulents would have been killed.

Perhaps a slow continuous rising of the ground was the principal cause, then a whole region would have been elevated during an unknown, but, apparently, long time, the water retaining its usual level because it cannot rise above the surrounding water level line, and so the distance between the surface of the earth and the life-giving fluid always increased. The plants which, in such a region, were, at first, common vegetables, during the continuous elevation of the ground and the apparent retreat of the water, gradually mutated their form and characteristics as otherwise they could not survive the always deteriorating situation. Some plants endured the barbarous treatment a longer time than others, but, at length, the heat and drought killed them also. Finally, there remained but a few survivors who possessed exceptional properties, chiefly, the wonderful water tissue which made of them pillars full of the indispensable life-elixir, so that they adapted themselves to their new way of life, and not waste, improvidently, the fruits of their mutation. As a first economy, they began to lessen their number of leaves, or to reduce them to rudiments and, in the place of leaves, there appeared thorns. They lessened the number of twigs and branches in some species in such measure that only a stem remained. This stem adopted a globular form (the smallest circumference allowing the greatest content) and there the plants reached the state which allowed them to save their lives and to conquer in the struggle against a superior enemy.

Though I have not yet written concerning that side of the case, I ought to say that I am convinced that, and I believe even in a great measure, changing climatic circumstances have also been of great influence. In such a manner these things must have happened so that Anáhuac, the Karoo, or in general the desert, performed the recreation. And we, succulent lovers, how can we see these things without great admiration ? Isn't it like a wonder ? if Nature, on the one hand, kills plants by want of water and, on the other hand, at the same time and place, create others who are reservoirs, who in the midst of the most severe drought are able to contain up to 70 per cent. and more of water ? Surely this last group has been obliged to change in nearly every respect, so far that the original forms are almost lost, but that what survived became, after many compromises, a kind of plant perfectly accommodated to the new circumstances—and which plant is more beautiful than, for instance, a cactus in flower, which has such an irresistible charm ?

Or, is all that not a kind of a wonder, but only common? If it was only common—then there would have remained in the deserts, and such like places, no plants at all, but only glowing, hot rocks and bare sand as the only adornment, whereas Nature now exposes, amidst the most horrible drought, plants in perfect condition, sources of water, fountains in exchange for a violent death by parching and thirst.

Helman's man in the desert saw only the naked necessity—the essentiality; we have now seen the perfect manner in which Nature performed her most blessed work and we also repeat, with great respect, the name of this wonder—of this symbolical landscape—ANÁHUAC.

STEMLESS MESEMBRYANTHEMUMS—*continued*

By G. G. GREEN

I wrote, last time, of the necessity for maximum light for the *Mesembs.* as they are used to brilliant sunshine and are constructed to withstand full sun, especially the amount we get in Britain. It is, therefore, as well to see that the windows are cleaned inside and out and all leaks stopped so that drips cannot damage the plants during rainy weather.

I did not give a soil mixture for these plants, but though certain species like more lime of some sort than others, or more leaf mould, a general compost can be used and the extras added to those species that desire them. Equal parts fibrous loam, leaf mould and coarse sand with the addition of half part broken bricks and mortar, ground fine, is good enough for most species. Some, like the *Fenestrarias* and *Frithias*, like twice as much coarse sand in the mixture, whilst *Titanopsis* require more lime and I will endeavour to indicate any species' needs in the description of each kind.

Following the *Gibbaeums*, I suggest as the next plants of equal interest, the *Dinteranthus*. These are interesting species with short, thick leaves somewhat flattened on the tops, very rounded and keeled below. The bodies are white to pale green, sometimes dotted with green. They have long fibrous roots which can penetrate deep into the soil and should never be watered from the top. The flowers grow on short stalks, are large and yellow, and are produced in spring and autumn. General growing period is in summer and even then very little water is necessary, none at all in winter, and there should be sufficient moisture in the soil to last out. When grown in pots, however, an occasional watering by standing in one inch of water for a minute or so is beneficial, as this prevents the root tips from dying back. Propagation is nearly always from seeds which germinate fairly easily.

D. inexpectatus : small round bodies, rather flattened on the tops, clefted and keeled slightly. Greyish white and very smooth, with flowers in September.

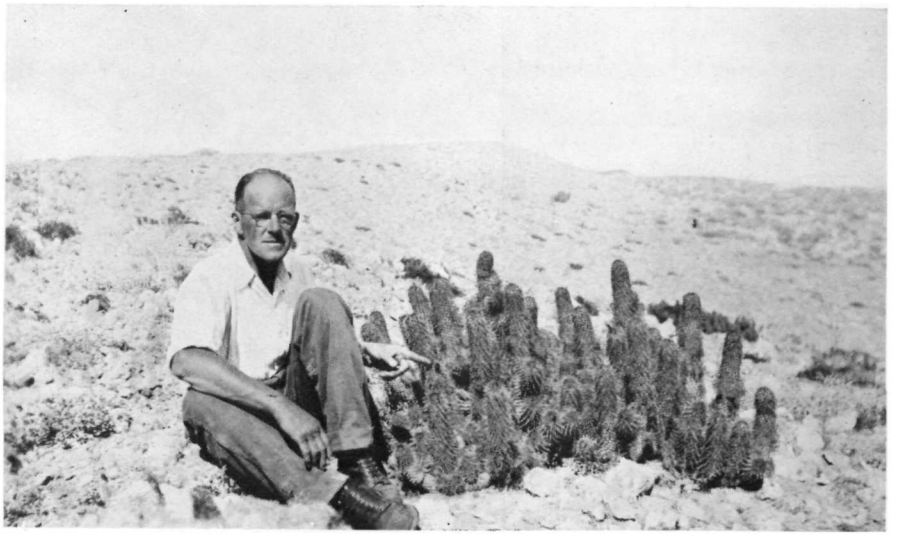
D. microspermus : probably the best and most interesting during the seedling state when they are almost spherical with small clefts and turned back tips. The colour is greyish white tinged with pinky violet and having raised greenish dots on mature plants. Later on the new leaves, in pairs, grow out from the cleft, thick and rounded. Flowers are produced in late autumn, sometimes in early spring.

D. Pole-Evansii : smaller growing, flat topped with a narrow, sharp cleft. The bodies are rounded, bluish grey with tinges of red, slightly roughened, especially on the tops. It is a good plan to have the surface of the soil covered with small gravel so that only the roots of the plants are in contact with the soil. Flowers are bright yellow, in spring, and very large.

D. puberulus : grows into small clumps of deeply clefted bodies, the leaves being united for only about half their length, keeled on the backs, rounded, with velvety surface, brownish green in colour and dotted with dark green. Flowers in autumn.

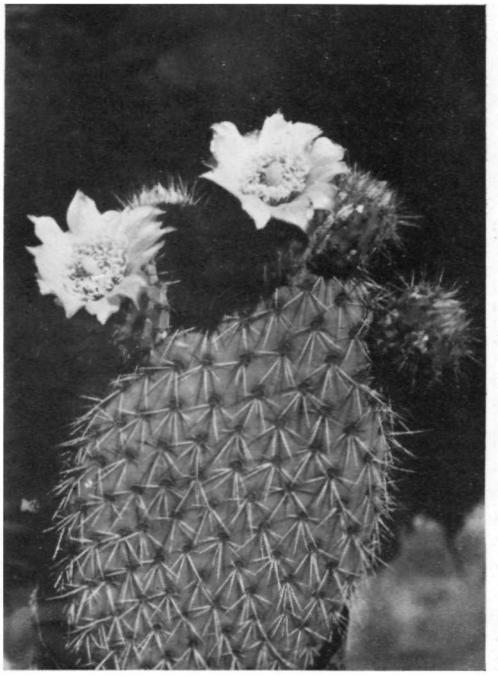
Rimaria Heathii and *Heathii major*, now classified as *Gibbaeums*, have stemless, rounded, light green bodies dusted with white. The clefts are sharp edged, splitting wide open to let the new leaves emerge. During the growing period, the bodies sometimes split across under the vigorous exertion of the new leaves. The plants quickly form clumps and like a little water in winter. Flowers are pale yellow, in autumn, opening towards late afternoon.

The *Titanopsis* are among the most attractive of all *Mesembs.* and should have a place to themselves in the garden, as they like a very sandy compost with a liberal helping of limestone in some form, either as limestone chippings or any other calcareous substance such as crushed shells, old mortar, etc. The rosettes of small low growing leaves blend very well with the limestone gravelly rocks and when the large golden yellow or orange coloured flowers are produced, the effect is most pleasing. The leaves are short spatulate, whitish green to greyish yellow, turning red at the base in winter. The flattened triangular tips are heavily tuberculed and, in some species, with short fine teeth on the edges and backs. Growth should not be encouraged in the winter, as too much water and heat will cause the leaves to grow upwards leaving open spaces between, which spoils the proper compact effect of natural growth. In all cases, water should be given only from the bottom as the leaves easily rot in damp weather if moisture is allowed to rest between them. Summer is the growing period when the plants can take a fair amount of water and as much sun as possible. In a well drained compost, similar to that described, the plants should soon form tight clumps from which divisions can be taken in early spring and rooted in sand.



W. Taylor Marshall points to a *Cochemiea Halei* bloom Howard E. Gates

Dudleya albiflora Howard E. Gates



Opuntia pycnantha G. Lindsay

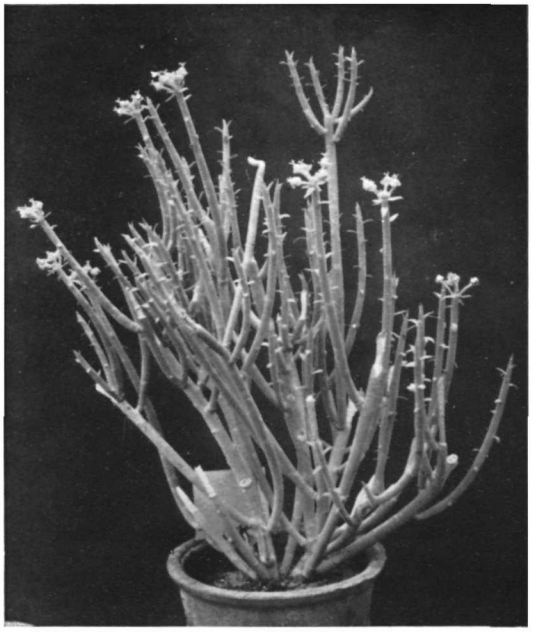


Fig. 1—*Euphorbia mauritanica* J. A. Janse

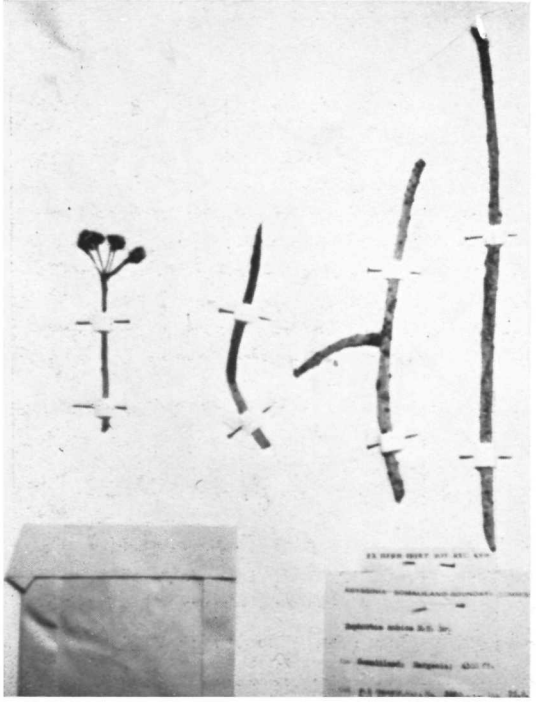


Fig. 2—*Euphorbia nubica* J. A. Janse

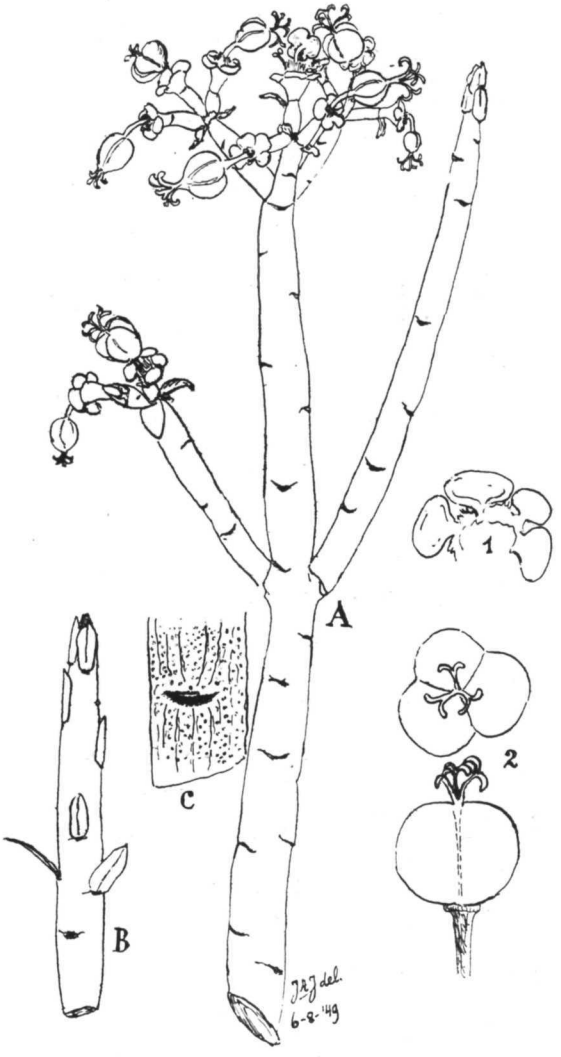


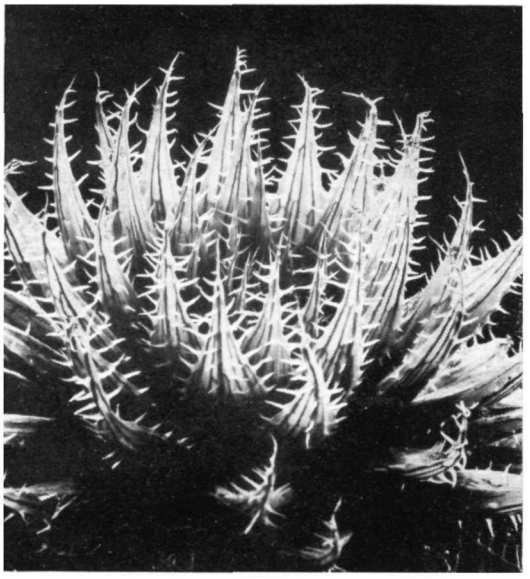
Fig. 3—*Euphorbia Schimperi Presl.* J. A. Janse

A. Flowering branch 1/1

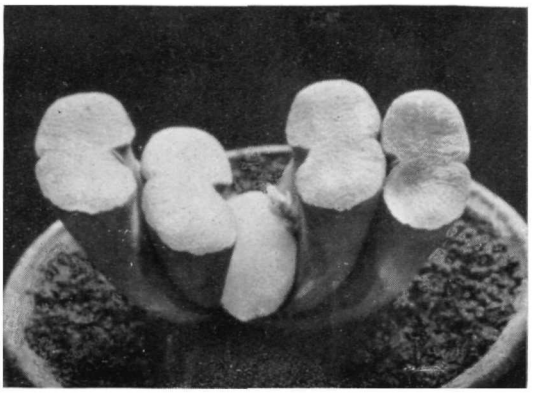
B. Young part of a branch with leaves 1/1

C. Leafscar 3/1

1. Glands 2 Carpels Orig.

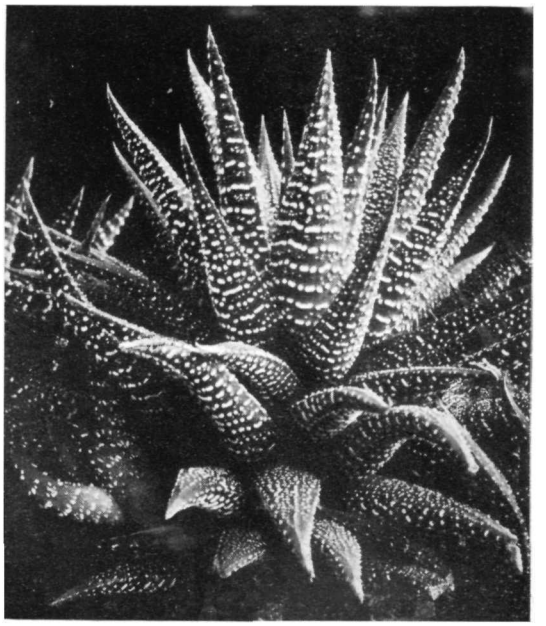


Haworthia arachnoidea A. J. A. Uitewaal



Haworthia truncata. Actual size. A. J. A. Uitewaal

Haworthia planifolia
Haworthia cymbiformis A. J. A. Uitewaal



Haworthia attenuata britteniana A. J. A. Uitewaal

Mr. A. Boarder with his 1905
Echinopsis Eyriesii Mddx. Gazett

Welwitschia mirabilis (male plant) Prof. G. C. Nel

Welwitschia mirabilis (female plant)
Prof. G. C. Nel

T. calcarea : is, perhaps, the best known and of easy cultivation. The leaves grow compact and very low, with the whitish tubercles most prominent on the flattened tips. The flowers are a bright golden yellow turning reddish later on, opening very close to the plant.

T. setifera : is more open in growth, with slightly thicker leaves of a greener colour. The tubercles are smaller and the tips bear fine bristle-like teeth. The flowers have a pink and yellow sheen and are larger than the preceding.

T. Schwantesii : grows more upright, the leaves being narrow with broad rounded tips and almost covered with yellowish tubercles. Flowers are smaller, pale yellow and stand higher than the others.

T. Primosii : is very similar to *T. Schwantesii*, being slightly smaller in growth, but having the same rounded heavily tubercled tips and pale yellow flowers.

T. Hugo-Schlechteri : is the most difficult to cultivate, The reddish green leaves are much smaller than the others, with the tips at right angles to the leaves, very triangular and covered with prominent tubercles. The plants grow in very compact rosettes and should receive no water in winter. They grow better when planted on a slightly raised hummock of soil.

T. Luckhoffii : has the smallest growth of all with small, densely tubercled leaves, with minute sparsely spaced teeth on edges and backs which are keeled slightly. The colour of the leaves is a bluish green and the flowers a pale yellow.

Pleiospilos. The " Granite " plants, as they have become known, are amongst the more succulent of *Mesembs.*, growing larger than the majority. The shape and colouring of the leaves lend themselves to their natural surroundings with good effect and it is surprising how completely this appearance camouflage can be obtained when suitable stones or rocks of granite are placed amongst them. They are very easy to grow provided the soil is coarse and sandy and that water is given sparingly when in the growing period and not at all otherwise. Too much water in winter and early spring will, if the plants do not rot, cause the leaves to develop out of shape and retard the production of new growth. They like full sun and plenty of fresh air during the greater part of their growth, as a close atmosphere will cause " rust " to appear on the leaves, which certainly mars their beauty, besides being an indication of wrong cultivation. If they are grown hard by giving them full sun and careful watering at the right season, their true shapes will develop and much pleasure derived from them, especially when the flowers appear in the summer. They seed very prolifically and this has led to many imperfections in the species as cross-fertilisation often takes place, with resulting confusion. True species can, however, be obtained and the following selection is fairly representative.

P. Archeri : very small growing, with leaves not much longer than one inch or so, narrow, rounded, reddish green in colour and with transparent green dots. Flowers are bright golden yellow, in August.

P. Bolusii : well known, with broad half-round leaves, keeled on the backs with a definite " chin " at the wrinkled ends. Colour is brownish green, spotted with dark green. Flowers yellow, in twos and threes.

P. simulans : is much like the above, except that the chin is absent and the leaves narrower at the beginning, heavily keeled underneath and wrinkled. Colour is the same, though some species remain a dark green. The colour of the flowers varies, in some species, from white to yellowish orange.

P. Dekenahi : is much smaller in growth and quickly develops other leaves at the sides. The leaves are broad in the centre, quickly tapering to a point, rounded underneath and greyish green in colour, with dark green raised dots and reddish edges. Flowers are straw colour and large.

P. Hilmari : is another small grower, rounded to cylindrical leaves, reddish green in colour, with darker markings and almost transparent tips. Flowers are very large and are produced freely, young plants from seed often flower after the first year.

P. magnipunctatus : large, broad, heavily keeled leaves, shining green in colour, with darker dots. Flowers golden yellow.

P. Nelii : is a handsome species with squat flat leaves almost hemispherical and having a sharp edged cleft, greyish green, with raised dark green dots. Flowers white to bronze.

P. nobilis : grows with two or three pairs of short broad leaves, triangular, keeled, grey green in colour, with darker raised dots.

P. Roodiae : has upright, rounded, triangular leaves, rather short and slim, yellowish green in colour. Dislikes excess water, especially out of season.

To be continued.

ANNUAL GENERAL MEETING

This was held at the R.H.S. Hall on the 7th February, 1950, with Mr. P. V. Collings in the chair.

The minutes of the last A.G.M. were confirmed.

The report of the Council and the accounts were adopted. Mr. Shurly, however, while appreciating the efforts of the Hon. Treasurer, suggested a simplification of the accounts so that members could arrive at exact costs of different items.

The Hon. Editor said that his work would be easier if more members contributed articles to the Journal. His request for reports on the seed received from Mrs. Nevin had received poor response. He asked that some one take over the advertising in the Journal.

The Hon. Librarian reported that the library was extensively used. Three books had been added during the year. He asked that books be not kept longer than one month and that all requests for books should be accompanied by membership number.

The Exchange Secretary stated that his section was still functioning satisfactorily. Members merely had to send their name to him and he supplied names and addresses of suitable members for exchanges. He expressed appreciation of Mr. Shurly's efforts in arranging the B.B.C. broadcast, which had proved extremely popular.

It was proposed by Mr. Boarder, seconded by Mr. Edwards, that the Earl of Mansfield be elected President. However, an amendment by Mr. Harle, seconded by Mr. Denton that Mr. R. S. Farden be elected President was passed and Mr. Farden was elected.

It was proposed by Mr. Shurly, seconded by Mr. Walden that only Mrs. V. Higgins be elected Vice-President, but an amendment by Mr. Boarder, seconded by Mr. Rowland that Mr. K. Harle be elected also as Vice President was passed and both were elected.

Mr. Collings proposed Mr. Rowland be elected secretary, and Mr. Shurly, seconded by Mr. K. Harle, proposed Miss Poore as treasurer. Both were elected.

Mr. Marks proposed, seconded by Mr. Naylor, that the three retiring members from the Council be re-elected and Messrs. Shurly, Walden and Aylott were elected.

Mr. Walden proposed, seconded by Mr. Aylott that Miss Lawrence and Mr. Border be elected Hon. Auditors. This was agreed.

The Branches reported satisfactory progress during the year. Appreciation of the efforts of the Branches was expressed by Mr. Edwards and was supported by the members present.

Mrs. Stillwell reported that arrangements had been made to have classes for cacti, etc., at the Windsor Park Show in July and interested members should communicate with her.

In a letter, Mr. Oakley suggested the A.G.M. should be held on a Saturday and that monthly meetings are held alternately on Tuesday and Wednesday. These suggestions were not adopted. A further proposal that a text book be prepared was referred for the consideration of the Council.

The Chairman moved that the time for the A.G.M. remain at 7 p.m. and this was carried.

The members were reminded that Shows should be better patronised as the entries would have considerable bearing on the holding of Shows in 1951, when accommodation would be difficult to obtain. A proposal was made for one day shows, but it was pointed out that this was not favoured when held in conjunction with R.H.S. shows.

Mr. Harle moved that a supply of leaflets, suitable for distribution, be prepared and this was agreed to. A further suggestion from Mr. Harle that a certain number of Journals be distributed to prospective members was referred to the Council and a vote of thanks was passed to Mr. Harle for his offer to assist in these matters.

A proposal to arrange a display at the Chelsea Show was discussed, but not adopted.

The meeting closed after the presentation of the certificates gained at the two shows.

THE CACTUS AND SUCCULENT SOCIETY OF GREAT BRITAIN

Income and Expenditure Account for the year ended 31st December, 1949

INCOME	£	s.	d.
Balance brought Forward	67	9	3
Subscriptions	283	5	6
Journal Advertisements	93	0	0
Sales and Subscriptions (Overseas)	26	7	0
Donations	1	0	6
Show Entrance Fees	4	12	0
Outing to Mr. Harle's	32	0	11
Kew Meeting	13	0	0
Journal Adjustments		17	6
Journal Account Credit from (Strange, Printer) ...	4	0	0
	£525	12	8
Amount shown on Bank Slip	104	3	2
Paid into Bank after 10th December, 1949	24	13	6
	£128	16	8
Less Cheque drawn not paid	5	0	7
Less Subscriptions for 1950	53	0	6
	£70	15	7

EXPENDITURE	£	s.	d.
Hire of Hall	9	18	9
Journals (Strange, Printer)	282	17	1
Ratcliffe, Cowling and Knight (Printing)	40	18	11
King (Engraving)		7	6
Insurance	1	1	0
Show Expenses	7	7	10
Coach to Mr. Harles	20	0	0
Lunches, Teas, etc. to Mr. Harle's	10	11	3
Teas, Kew Meeting	12	11	0
Library Books	8	11	4
Herr Jacobsen's Lecture	8	11	6
Deposit (Coach to Harle's)	4	0	0
Postages	29	10	10
Branch Expenses	8	16	4
Petty Disbursements	2	4	7
R.H.S. Affiliation Fee	2	2	0
Cheque Book		12	8
Returned Subscriptions		14	6
Balance in Hand	70	15	7
Credit from Journal Expenditure (to be deducted from 1950 Account (Strange, Printer)	4	0	0
	£525	12	8

Audited and found correct.

W. A. GLADWYN

M. LAWRENCE

D. M. POORE, *Hon. Treasurer.*

NOTES ON EUPHORBIAS

(On some species of the sections *Tithymalus* and *Tirucalli*)

By J. A. JANSE, F.R.H.S.

In the April and July issues of 1948 a general survey may be found, dealing with the genus, so we refer to these publications for the technical terms used hereafter.

With *Arthrothamnus*, the sections *Tithymalus* and *Tirucalli* comprise frutescent and herbaceous species, which only partially display succulency.

Tithymalus is a name already found with the oldest authors on plants, including the Greek scientist Dioscorides, the Roman naturalist Pliny the Elder, and the Greek Apuleius. The name has been used by all the pre-Linnean authors to designate *Euphorbia* species. It is mentioned by P. A. Matthiolus (1501-1577) in his Commentary on Dioscorides, as well as by Dodonaeus (1517-1585), which both described and illustrated several species. They also used the name *Euphorbium* to describe the highly succulent *E. officinarum* L.

J. Commelin (1629-1692), and his nephew Caspar (1667-1731), used *Tithymalus* to designate, also, highly succulent species, but Boerhaave (1668-1738) used the names discriminating both the frutescent (*Tithymalus*) and leafless (*Euphorbium*) species. He also described very clearly the cyathium, though still considered as a single flower.

The name *Tirucalli* is of Indian origin and appears for the first time in 1697 in van Rheede's "Hortus Malabaricus." It is a curious fact that the species *E. tirucalli*, first described as an Indian plant, is widely distributed in southern and eastern Africa and the Indian specimens must be considered as immigrants in that country, probably first introduced by Portuguese travellers. It was the Swiss botanist, Edmond Boissier, who used both names, *Tithymalus* and *Tirucalli* as sub-generic ones.

In this article we have to deal particularly with those species introduced into cultivation. Both sections contain many frutescent species, many of which have never been introduced in our collections, on the other hand, some species are relatively common.

E. tirucalli L. is a rather well known species which may be found in well developed specimens, particularly in our botanical gardens, where they have sufficient space to grow into a small tree, sometimes rising to ten or twelve feet in height. It may be easily recognised by its deep green bark and the small sessile cyathia developed at the apex of the branchlets. White, Dyer and Sloane's monograph gives a good illustration in fig. 89. As a synonym, this work mentions *E. rhipsaloides* Welw. (1856). I cannot say whether this is the same as described by Lemaire in Illustr. Horticole 3 : 72 (1857), from a living plant grown in the Jardin des Plantes of Paris, but specimens sold in Holland under that name undoubtedly belong to *E. mauritanica* L. as they show clearly the terminal umbel of pedicelled cyathia (fig. 1).

E. mauritanica L. is a very variable species, distributed in various parts of southern Africa, the specific name *mauritanica* being misleading as to its habitat. The beautiful and very instructive illustrations given by White, Dyer and Sloane in their Monograph (l.c. p. 107-120) will be very useful to all students of this species.

E. Schimperi Presl. (Bot. Bemrk. 109. 1841) is a similar succulent shrub, first described from specimens collected in southern Arabia. According to various botanists, it is also widely distributed in Eastern Africa (Somalia, Eritrea and Nubia), but N. E. Brown has separated these specimens under a new name, *E. nubica* (Flora of Tropical Africa 6 : 1 ; 554 (1915)) writing as follows : "This is readily distinguished from *E. Schimperi* Presl. by the scarcely diverging branches and much longer rays of the umbel. Several perfectly distinct species bearing a superficial resemblance to one another have also been mistaken for *E. Schimperi*, which does not seem to occur in Africa. Possibly the plant collected by Rosen and named *E. Schimperi* by Pax in Engl. Bot. Jahrb. 39 : 631, may belong here. I have not seen it." For us, collectors of succulent plants, questions of this kind are always difficult to solve for lack of sufficient material, which, moreover, is almost exclusively of garden origin. Being in Italy, I had the occasion to see the dried material deposited with the Herbarium of the University of Florence, a collection very rich in plants of eastern Africa. Specimens of the true *E. Schimperi* Presl., collected in Arabia by Schimper himself more than a century ago, did not show any discriminating character, being too much damaged. Other specimens of

E. nubica N.E. Br., from various localities in Abyssinia and Eritrea, showed terminal umbels of cyathia with slender pedicels of quarter to half inch in length (fig. 2). They strongly resemble the figure given by Berger (l.c. p. 25) under *E. Schimperi* which, however, according to N. E. Brown represents the true *E. nubica**.

I received plants under the name of *E. Schimperi* Presl. from various sources. A plant obtained from Neale's is illustrated in fig. 3. This plant differs from the description of *E. Schimperi* Presl. (as the original description is not available I refer to that given by Boissier in Prodromus) by the form of the leaves which are broadly ovate and somewhat cuspidate, whereas they never show any tendency to reflex. This plant has short thick pedicels, 2½-4 mm. thick and 5-10 mm. long. The bracts are broadly obovate with a short tip. The stems are 8-12 mm. in diameter, dark green with waxy coating, the leaf scars crescent like, reddish brown. Also this plant develops a sessile, male, central cyathium, later followed by the bi-sexual, short pedicelled, lateral cyathia. The male cyathium develops up to seven glands. At the time that the central cyathium begins to wither, the above described bracts shrivel up as well and drop.

This plant differs very much from the plants grown in gardens at the Italian and French Riviera (La Mortola, Jardin Exotique de Monaco, Botanical Garden of Catania, Sicily) under the name of *E. Schimperi*. These plants, on the other hand, represent truly the type described by Berger. Their leaves are very narrow, canaliculate and strongly reflexed. Probably all these plants belong to *E. nubica* N.E. Br.

*Translation of Berger's description, l.c. p. 25 :—

" Loosely branched shrub attaining two metres in height. Branches terete, rather long, thick as a pencil, first erect, then decumbent and irregularly branched, dull dark green with somewhat apart crescent-like reddish leaf scars. Leaves at the base heart shaped, then deltoid—lanceolate and acuminate, 3-15 mm. long, somewhat canaliculate and reflexed. Cyathia 3-6 in sessile umbel, the outer pedicelled, the central cyathium sessile, male, the first with two ovate, convex bracts with ciliate margin. Involucre globose, lobes ovate, obtuse finely whitish ciliate. Glands mostly four, rarely five, in the central cyathium up to 6-8, transversely ovate or roundish, patent, with entire margins, flat, glabrous, yellow. Ovary pedicelled and exserted from the involucre, glabrous. Styles united only in the lower half of their length, pistils rather deeply bifid and reflexed. Capsule flat roundish, glabrous with faint grooves, 10-11 mm. broad ; seeds ovate, acuminate, white, somewhat tuberculate-rugulose, 4 mm. long."

Mr. Shurly has, once more, given a quantity of seed for distribution among the members. The seeds are all of South African succulents. They have all been sorted and packeted into just over two hundred packets. It is impossible to list the varieties of seed as, in some cases, there was only enough for one packet to a species. Members desirous of obtaining some of this seed should send a stamped addressed envelope to Mr. A. Boarder (who sorted and packeted the seed), Marsworth, Meadway, Ruislip, Mddx., mentioning any particular species they are seeking, otherwise mentioning the genera they are interested in. Mr. Boarder will endeavour to satisfy members, but failing this, members may leave it to Mr. Boarder's discretion and he will then send them seed to the best of his ability.

The Berks and Bucks Branch have been successful in causing to be included classes for cacti in the Royal Windsor Rose Show to be held in the grounds of Windsor Castle, by special permission of H.M. the King, on the 7th and 8th July. The Branch is confining the entries to their own members, but they would be glad if other members could visit the Show. The entrance is opposite Windsor Riverside Station in Dachet Road.

Our Journal subscriber, Mr. A. E. Irving, 2163 Alameda Avenue, Alameda, California, U.S.A., reports that no member responded to his request for contacts with those interested in Conophytums. He would like to correspond with advanced collectors of succulents other than cacti.

The annual visit to Kew will be May 27th, No. 5 Succulent House, 2 p.m. Members wishing to book for tea and so avoid waiting in the queue, should notify Mr. P. V. Collings, 53 Northumberland Road, New Barnet, Herts.

We hope to visit the nurseries of W. T. Neale and Co. Ltd., at Worthing on a Sunday later in the year, by coach, including lunch and tea. Further details will be given in our July number.

Old numbers of the Journal are gradually being sold and soon will only be available at the second-hand booksellers at enhanced prices. Vol. 7, No. 1 has now been sold out and stocks of others are nearly gone, such as, three Vol. 2, Part 3 ; five Vol. 2, Part 4 ; seven Vol. 6, Part 2 ; six Vol. 8 Part 1. It is advisable to apply to the Editor, Mr. E. Shurly, 7 Deacons Hill Road, Elstree, Herts, without delay, sending remittance with your instructions (see inside front cover).

SOME INTERESTING HAWORTHIAS

By A. J. A. UITEWAAL

Haworthia fasciata (Willd.) Haw. is a species that is well known by name, but I believe it to be rather rare in collections. The plant that is well known and widespread under the name of *H. fasciata* var *caespitosa* Berger, does not rightly fit in with the *fasciata* group. Mr. Farden, justly, placed it in the *attenuata* group ; its appropriate name, therefore, being *H. attenuata* var *caespitosa*. All the *attenuatas* have tubercles on the face and on the back, those on the back being more or less larger than those on the face. The type and all the forms of *H. fasciata* have their faces completely smooth, or nearly so, this being one of the main characteristics by which these groups differ. When Haworth first described *H. fasciata* in his Supplement (1819), he called it the " barred pearl." In this Journal, Vol. 6, No. 4, some forms of *H. fasciata* were described and figured by Dr. Karl von Poellnitz, of which *H. fasciata* forma *variabilis* surely is the most interesting as the leaves are smooth on the back also, or, at least, nearly so. This shows us how unreliable is the characteristic " pearls."

H. Poellnitziana Uitew., like the above, belongs to the section *Margaritiferae*, containing rosette forming plants of which the leaves bear white or more or less concolorous tubercles. This section can be divided into two sub-groups ; one containing plants with proportionately narrow, cuspidate-attenuate leaves provided with small tubercles, i.e. *H. attenuata* ; the other group contains plants with proportionately broad, ovate-acute leaves and rather large tubercles, i.e., *H. margaritifera*. *H. Poellnitziana* takes a place between these groups, having long cuspidate-attenuate leaves with rather large tubercles. When looking along its leaves, from top to the base, the tubercles, especially on their face, seem to be arranged in rather regular longitudinal lines. As far as I am informed, it has not been re-discovered in its locality (Drew), this species, therefore, is rare. The type plant, grown in the Amsterdam Botanic Gardens, did not make offsets. Later, I received some plants from another source ; of these one was near to the type plant, the others had tubercles otherwise arranged or more scattered.

H. truncata Schonl., with its bifarious arrangement of the leaves, which seem to be cut off horizontally, giving it an unusual appearance, is a most remarkable plant. It is much sought after, but not very often seen in collections as its collecting and export is forbidden. It is rather variable, principally in the thickness and the breadth of the leaves. On their thickness, von Poellnitz based three forms, viz., forma *normalis* (6-8 mm.), forma *tenuis* (3-4 mm.) and forma *crassa* (9-11 mm.) ; the latter is shown in our photograph. In its natural habitat, this species possesses fleshy, long roots with feeding branches in the lower part. It grows well with us when it has not lost these thick, fleshy roots ; kept too wet these roots rot, kept too dry they will dry up, so one has to keep the mean between these extremes. In nature, of course, the plants are acclimatised, not as with us under pot conditions. Once its natural root system is lost, the plant forms roots at the base of its leaves which keep the plant alive for a long time, but it will become smaller and smaller until it finally dies. In its natural habitat, in the dry season, it is withdrawn into the soil by contractile roots. The thickest and oldest parts of the fleshy roots provide the greatest contraction as is shown by horizontally transverse wrinkles ; the smaller branches attach the plant to the soil. *H. truncata* first makes offsets in later life, but it can be propagated by the leaves, one leaf, sometimes, producing several young plants. I possess a plant with thirteen leaves, which is more than usual. However, I hesitate to break off a leaf for propagation purposes. This species is a good example of the windowed plants. The windowed areas are devoid of chlorophyll and act as a filter to the strong sunlight which is much reduced when reacting on the assimilating tissue beneath. Dr. Schonland rightly pointed out that such plants, though often growing in full sun, are physiologically shade plants.

H. limifolia Marl. is another particularly attractive species. The name indicates the similarity of the leaf faces with the ridges of a file, one could also call it the permanent-wave-*Haworthia* ! In some plants, these waved cross ribs are perfectly complete, in others, they are, more or less, interrupted and irregular, in the latter case their tubercle like character is more evident. In some forms, the arrangement of the leaves seems to be spirally-bifarious, whilst the tubercles, or the ridges, are not concolorous, but white tipped. Several years ago, when repotting my first beautiful, full grown specimen which had a nice offset at the pot edge, I was surprised to find some long subterraneous " roots," stolons, turning through the soil near, and against the pot wall, one ending in a young plant. Stoloniferous plants are not so very rare among *Haworthias*. *H. tesselata* being the most well known example, but such thick stolons as those of *H. limifolia*, some of them more than half a centimeter, I had not seen

before. If not pot bound, but grown freely in the soil, the stolons of this species may reach a considerable length, a length of about 70 cm. has been noted. This production of stolons is not confined to var *stolonifera* only.

H. arachnoidea (L.) Duval is a much desired species, however, it is rather scarce as it does not produce offsets. About 1700 it was introduced into Europe. According to Ker, in Botanical Magazine, about 1804, it should have been a very common plant, but I am nearly sure that somewhere an error must have taken place. As the name implies, its appearance shows a similarity with a cobweb. This may be appropriate in some degree, but *H. Bolusii*, which has longer, more and thinner bristles, has much more the aspect of a densely woven cobweb, just like the well known *Sempervivum arachnoideum*. The teeth-like bristles on the margins and keels of the leaves of *H. arachnoidea* are broadened at their base, the leaves ending in a toothed bristle of about one cm. long. A full grown specimen reaches a diameter of 8-10 cm. ; when it is in full growth the leaves are, more or less, spreading. It is especially beautiful when seen against the light as is shown in the accompanying contrast photograph. The leaves are pellucid to the top, ornated with several opaque, longitudinal, somewhat connected, lines. This pellucid leaf top forms one of the main differences between this species and *H. setata* and its forms.

H. attenuata Haw. has already shortly been mentioned. It is a common plant, I believe it to be one of the most widely cultivated *Haworthias* all over the world. An interesting plant needs not to be a rarity ; a common plant is not only common because it easily makes offsets, but also because people like it ! However, some people like rarities most, but if we asked plant lovers which plants give them the most pleasure, rarities or common ones, I am sure the mass would say—common ones.

H. attenuata is very variable, scarcely two plants being quite the same. There are forms with smaller or broader, longer or shorter leaves. The tubercles on both sides of the leaves may be more or less crowded, but those on the back generally larger than those on the face. The tubercles on the face are generally scattered, those on the back quite differently arranged. Sometimes they wholly merge into complete crossbands, on the other hand, the tubercles can stand quite apart and even more or less scattered. The colour of the tubercles, also, may differ, some plants having greenish white, others nacreous lustred and, others again, chalky white tubercles. Mr. Farden, in this Journal (Vol. 8, No. 2), published a series of forms on the disposition of the tubercles ; a sub-division which was very artificial, of course, nevertheless by these diversities this species is generally easily recognised. The most well known form—and indeed the finest, is the var. *caespitosa*, with complete or nearly complete white crossbands on the back of the leaves. There also exists a very beautiful form with somewhat bluish green leaves of which the tubercles on the margins merge into longitudinal, short, little, white lines. The larger tubercles on the back may also be intermixed with smaller ones, as is clearly shown on the accompanying photograph. Such plants belong to the var. *britteniana*.

H. planifolia Haw. and *H. cymbiformis* Haw. are shown together on one of my photographs, that at the top, which is much like an opened rose, being the first mentioned. These, doubtless, related plants are sometimes regarded as separate species, sometimes *H. planifolia* is mentioned as a variety of *H. cymbiformis*. With each of these, again, several forms, or varieties, have been found and described and several more may still be found and are, therefore, not yet described. Dr. von Poellnitz described *H. planifolia* var *transiens*, which is an intermediate form between the two species. Because the form of the leaves of this variety is somewhat nearer to *H. planifolia* the name of the variety has been connected with this species. Both the plants in our photograph show rather well the typical form of each of the species. I think it would be of little use to give details about the many described varieties as imported plants soon become modified, i.e., change their tender, delicate characteristics. They are grown with us under quite different conditions ; these soft leaves species, even in their habitat, show differences when found in full sun, or in shadowed places ; nourishing or poor soil even cause differences. In our collection we have a small form of *H. cymbiformis* of which the leaves are nearly completely glassy pellucid, only marked with some opaque longitudinal lines, the variety *translucens*, in particular. *H. cymbiformis* is also a species that is very well known by name, but which, however, one does not meet so often in collections. Another species, viz., *H. cuspidata* is very often distributed under the inaccurate name of *cymbiformis*, this, however, is quite another plant, easily recognisable by its distinct retused, also flat topped leaves. The main differences between *H. cymbiformis* and *H. planifolia* are clear from our photograph ; the former having generally erect leaves, hollow on the face and very convex on the back ; the latter having leaves which are flat on the face, much thinner and recurved-spreading with age. Both species, including most of the described forms, produce offsets in an amazing way and soon make nice clumps. *H. planifolia* is called by Haworth " the flat oval leaved " ; *H. cymbiformis* he called the " boat leaved," because the leaves " remind us of the little hollow boats which schoolboys make."

WELWITSCHIA MIRABILIS

One of the strangest plants in the world.

By H. HERRE

There are many succulent plants in the world, but only one *Welwitschia*. While most of the others belong to famous succulent Families like the *Cactaceae*, *Aizoaceae*, *Crassulaceae*, *Asclepiadaceae*, etc., our plant belongs to a Family of its own, the *Welwitschiaceae*, which is closely related to the *Gnetaceae*, a Family which stands between the *Gymnospermae* and the *Angiospermae*. There are two other Families belonging to the *Gnetinae* and they are the *Ephedraceae*, mostly shrub like plants of the warmer climates of which the green parts in some way resemble the horsetails (*Equisetum*). The others are the *Gnetaceae* which consist mainly of tropical or sub-tropical trees which show well developed leaves, so that nobody would think that they are closely related to the *Welwitschiaceae*, but both Families are, owing to their reproductive organs.

Our plant is named in honour of Dr. Fr. Welwitsch (1806-1872), an Austrian physician and scientist, who visited the southern parts of Angola and the northern part of South-West Africa during 1853-1861, where he found this famous plant which was discovered again shortly afterwards by Thomas Baines (1822-1875) the intrepid English traveller and one time companion of David Livingstone. Hence, Dr.Welwitsch named our plant *Tumboa Bainesii* Welw. in his honour, while the genus *Tumboa* was the native name for it. Probably Dr. Welwitsch did not draw up his description properly and thus Sir Joseph Hooker (1817-1911), Director of the Royal Botanic Gardens at Kew, described it in the Translations of the Linnaean Society in 1883 and named it there *Welwitschia mirabilis* Hook f., accentuating with the specific name the " wonder " or the " peculiarity " of this plant.

Today one finds specimens of this plant in most museums. The plant has a peculiar habit and grows for centuries. To develop such a plant, the climate must have been the same for hundreds and thousands of years. Its natural habitat is the Namib Desert along the west coast of South-West Africa, starting about Swakopmund and occurring deep into Angola. The places near Swakopmund are the best known ones where, as everyone knows, it grows among the sand and stones of the desert, while in the northern parts of its home, it grows among grass poles which makes things look much nicer than the first mentioned place. In this region it does not form a continuous strip, but where it occurs, it grows abundantly, but the region is never a very broad one. Its native climate is a markedly desert one with a mere trifle of rainfall. The bulk of the moisture is derived from sea fogs which cause a heavy deposit of dew. Hence our plant will not be a quick-growing one. The stems are only one foot to three feet long, but with older plants the circumference may reach ten feet and more and they look, in one way, table like, also if they are not plane at their surface. Besides the cotyledons which disappear after a short time, the plant develops only two leaves and they go on growing at the base throughout its life. The leaves are leathery, blue-green and may reach three to ten feet in length. Owing to the strong winds of the desert, the leaves are split in their length and look like leather straps lying on the sand of the desert. The ends dry up, but the basal part of the leaves continues to grow.

The stem exhibits concentric grooves upon its surface. In the outer (younger) ones of these, the flowers appear annually. As the plants are dioecious, there are only male or female flowers on one plant. The flower stalk splits several times and produces only a few flowers with the male, but more with the female ones. The small cones of the male plants are red brown. As with the *Angiospermae*, they are covered by bracts which become bright red with the female plants after fertilisation has taken place. The female cones are bigger ones and reach the size of small pine cones when ripe. The pollination is done by certain insects which one will always find on the plants during this time of the year. It is really a Hemiptera—Odontopus sexpunctatus—which lives on the sugar solution of the micropyle which causes these insects to be attracted for the pollination of the flowers. Unlike all the other *Gymnospermae*, the male flower of our plant shows also rudimentary female parts with the integument of the ovule looking like a style and stigma. In its natural environment the larger and greenish female cones are ripe for pollination during January. In May the seeds are already ripe. They have broad wings and hence are distributed by the wind. The seedlings come up about two weeks later and develop immediately a long tap root which enables them to catch every bit of moisture.

In the July issue, 1948, of the Journal of South African Botany, the writer reported about a *Welwitschia* plant that he raised from seeds twenty-one years ago, which had just formed its first flowers. This report had also been brought by this paper and readers are asked to re-read it in connection with this contribution. It shows that, in spite of its isolated habitat, this plant can also be grown in cultivation, but it takes quite a long time till it will show any flowers. Also in Europe and elsewhere, this interesting plant has been raised from seeds, but as it is not so warm and sunny there as it is in South Africa, it will probably take much longer before the plants will develop any flowers, if they ever will. But in similar climates as South and South-West Africa, it will grow in cultivation as the plants of Dr. M. Morgan in Richmond, California show. The plant prefers to grow in decomposed granite, but there must be no mica in it. Of course, an amount of humus soil may be added as it will help with the development of the plant. During winter it may be kept dry, but during summer it stands quite a good amount of moisture. It needs much sunshine and heat to grow well. But it is worth while to take trouble with it as it is such an outstanding plant.

For stamp collectors, I may add that this " Pride of South-West Africa " is shown on the ten shilling stamp of South Africa, growing in its natural habitat.

In addition to the usual Challenge Cups, " Amateur Gardening " is awarding a Bronze Medal and a Diploma at each of our two Shows this year (July 11th and September 12th). Every member who can, should enter their plants. Schedules will be despatched to all members in good time. Prize money has been increased to 7/6 for firsts, and 5/- for seconds, with certificates for firsts, seconds and thirds.

At the A.G.M. the Editor asked for help in obtaining advertisements as editorial duties completely take up his available time. If any member has experience of advertising and would take on these duties, please communicate with the Editor, Mr. E. Shurly, 7 Deacons Hill Road, Elstree, Herts.

THE

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SOCIETY NEWS

1950

Aug. 29th, 7 p.m. Miss E. F. Kelly : Succulents. Bring succulent plants other than cacti.

Sept. 12th, 7 p.m. Autumn Show: Discussion on the Exhibition.

Oct. 10th, 6 p.m. A. J. Edwards : Electricity in your greenhouse.

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EDITORIAL

I have had a difference of opinion with a very prominent member, and a very well informed person, too ; not a serious difference, of course, but I am going to hang on this difference the opportunity of a little homily that I hope will clear the air in a far wider sense than the difference in question.

I had the temerity of correcting this friend of us all when he mentioned *Mammillaria pusilla.* I pointed out that the plant was *Mammillaria prolifera* and that *M. pusilla* was simply a synonym. He replied he got the plant as *M. pusilla* and under that name it would remain ; what was in a name, so long as we grew fine plants names did not matter. I rejoined that he was an " apostle of chaos ! "

He is the leader of what I call the " horticultural " section of our community, and considers a fine plant is the only desiderata, but, unfortunately, names are necessary. Just imagine thousands of people born in a town, none of them having names, but subject to physical culture to make them the master race ! We would have to go into long descriptions when the police " wanted " them, or the authorities wanted to collect rates and taxes, but, possibly, in such an ideal (?) state there would be none !

The comparison between humans and our plants' naming is not absurd. Take John Smith. The genus is Smith and the species is John, and, probably, a plant name would be Smithsia Johniana. Have we to go into a long description of the person or plant, taking, say, something like half-an-hour when Smithsia Johniana or *Mammillaria prolifera* is all that is needed ? John Smith might have a common or garden name, or a synonym, we call them nicknames, such as Smiler, but he would still remain John Smith. If we are going to have endless names of the same plant there can only be chaos and there is enough without perpetuating the old. Our job is to clear the air, not vitiate it.

Mammillaria prolifera was first named by Miller in his " The Gardener's Dictionary," in 1768, *Mammillaria pusilla* by De Candolle in his " Catalogus Plantarum Horti Botanici Monspelienus " of 1813. Britton and Rose, and other competent botanists, recognise them as the same plant. *M. prolifera* has priority and *M. pusilla* is a synonym. Unfortunately, the issue is further confused because *M. pusilla* has been confused with *M. multiceps,* particularly in the variety *mexicana,* but *M. pusilla* has nothing to do with *M. multiceps* and the variety should be *M. multiceps mexicana.* The confusion between *M. prolifera* and *M. multiceps* is due to the parallel description, but the two plants are distinct.

The General Electric Company Ltd., announces reductions in the price of their Storage Block Sterilising Chest, model HO 5072, to £97 10s. 0d. Also their 100 VA Soil Warming Transformer, model XT 5452, to £3 12s. 6d.

CULTURAL NOTES

By A. BOARDER

In my Cultural Notes in the April Journal, I advised you to refrain from watering *Lithops* and *Conophytums*. I wrote those notes early in the year, but realise that the Journal does not reach you until well into April. By that time most of the *Lithops* may require some watering. It is impossible to lay down a hard and fast rule as to when to start watering as some plants need water sooner than others. When the old stem has almost withered away is the time to start watering. You will notice that some of the *Lithops* will have made all new growth before some have hardly commenced to shrivel their outer stems. It is good to see the new growth breaking through. You will find that those plants which flowered last year will make two stems instead of one when they burst through the old skin whereas those which failed to flower will probably only make one stem this time. I do not cease watering the seedlings of the first year either of *Lithops* or *Conophytums*. Use your discretion, and only stop watering when the plants are of a size of at least half-an-inch in diameter.

I expect that by this time you have had the majority of your Cacti in flower. I find that my peak time is in April and May. This year I have had hundreds of flowers out already, and this is only the middle of May. Many of the *Mammillarias* have had rings of flowers out and, on one, *M. bocasana*, I counted seventy-three flowers out at one time. The plant was a picture, and many more flowers continued to open over a long period. I am afraid that we are inclined to ignore the more common Cacti as beneath our notice, but who can fail to get a thrill when an ordinary *Echinopsis* flowers. I have just had a two-year-old seedling plant of *Rebutia senilis* in flower. This plant was magnificent. It is about an inch-and-a-quarter across, and had three flowers out together which were one and seven-eighths of an inch in diameter. The colour was slightly darker than *R. minuscula* and the petals were larger, truly a grand plant. As I write I have by me an *Epiphyllum* in flower. It is a beautiful salmon pink, or almost flamingo in shade. It is very showy and compares very favourably with many of the rarer plants. This plant has flowered on the stem which grew last year and it is advisable to treat these plants a little drastically as regards their pruning. If you remove all the oldest stems each year you will find that the plant will make good new growth which will flower the following year. The *Epiphyllums* like a fairly rich soil, but I find that the potting soil which I recommend will do very well. Often these plants will start to form several buds and many of these do not develop. This often happens with other types of Cacti as well, and sometimes the addition of a little John Innes liquid fertiliser will help more to develop.

One of the most colourful of the *Mammillarias* is *M. Zeilmanniana*. My plant has just had a double ring of flowers out at the same time, and as the colour is a bright cerise, one can imagine what a picture it was. Many of the other *Mams.* have magenta flowers on a background of white spines and wool and look very attractive. The common *M. prolifera*, or *pusilla* as all the older members will know it by, can also look fine when it has a number of flowers out at the same time as it carries a number of scarlet fruits from last year's flowers. The seedling plant of *Pseudolobivia kratockvilliana* has flowered again, and the scent of the bloom filled the greenhouse. This plant of mine did not behave very well last year. It had over a dozen flowers, and one of them developed right at the growing centre. After the flower, an off shoot formed and so spoiled the look of the plant that I had to remove it. This has rather ruined the plant as it caused a scar to form which will take some time to disappear.

The *Notocactus* genus is a good one for producing many showy flowers. I have often seen a *Notocactus Ottonis* in full flower on a cottage window-sill. This plant is taken indoors for the winter and kept quite dry and brought out again each spring. An *Aporocactus flagelliformis* keeps this plant company and also flowers well each year. My own plant of this species has had over two dozen flowers open, and this is also a plant which many may despise as being too common to trouble with, but it well repays a little extra care. I think that for beginners the Genus *Rebutia* is one of the easiest to grow and flower. I have had several kinds in flower in two years from sowing the seed. Several of my last year's seedling *Mams.*, have buds forming including *M. Wildii*, *M. Schelhasei* and *M. bocasana*, whilst very many two-year-old *Mams.* are now in flower. Among the *Mams.* are a few which are sweetly scented. They are *M. camptotricha*, *M. decipiens*, *M. Baumii* and *M. albescens*. The *Dolichothele* genus are also scented and have rather varied scents of lemons.

I reported in my last notes that I had potted up many seedlings in the John Innes Seed Compost to which had been added, to each bushel, an ounce and a half of hoof and horn grist, and three-quarters of an ounce of sulphate of potash. The seedlings which I moved are doing very well indeed, and I shall continue to use this compost for seedlings when potted up. I have often remarked on the way that Cacti will grow in pots or pans without much

drainage in the base of the pot. I have recently made a number of concrete troughs to stand on the wall inside my greenhouse. These have no drainage holes in them at all and hold water well. The seedlings which have been transplanted into them are making splendid growth and don't seem to mind the lack of drainage. I find that in very hot weather what water is given does at least remain in the pan and does not run out the bottom.

During the very hot weather I have had to water my seedlings twice a day, although the glass covering them was shaded with white-wash. Many of the seedlings have been pricked out into a mixture as recommended above, and there is no doubt that, if you are very careful when you move them, they will benefit from the shift and soon make new growth. I do not advise you to sow seeds of Cacti and other succulents after July. Save them until next year, as unless you have very good heating in your greenhouse you are only going to give yourself a lot of trouble, and probably worry, as well. Also I do not advise you to transplant seedling Cacti after August. It may turn out all right if you can maintain a temperature of about 70 degrees, but if this cannot be done, it is better to leave the seedlings where they are until the spring. So many members tell me that they get the seedlings up and that they then stand still for a long time and it is almost impossible to get them growing again. There may be several reasons for this check, but I expect that the commonest one is that the soil has lost its nutriment and the seedlings require a change of soil. The John Innes Seed Compost is not intended to last indefinitely, and the plants should be removed as soon as they appear to have stopped growing. The seedlings are sometimes checked by being exposed to the sun too quickly. They should be shaded until they have formed strong spines, and then they should be introduced to the sun gradually. Sometimes, if the seedlings have been overwatered, the roots die and then the plants stop growing. In this case you must be very careful how you proceed as, if you water again too quickly, the plant may die. I do not as a rule have much to say on raising other succulents from seed, as, as a rule, they are as easy to grow as ordinary garden plants. Perhaps some of the stemless *Mesembryanthemums* are a little awkward, but as long as you see that the pans of seeds are uncovered by glass and are given plenty of air as soon as they are up, you will have no trouble. I find that many kind grow so quickly that they may be potted up at about six months of age.

Most of your plants will benefit from plenty of water for the next three months. Give plenty of air at all times and do not water again until the pots have quite dried out. This may take one day or a week, according to the weather. Now and again it is advisable to loosen the top soil in the pots as this allows a little air to penetrate into the soil. Keep a sharp look out for pests at this time of the year. It is so easy to kill one mealy bug, but if the numbers increase to a few thousands it may become a job too big for you to deal with easily. I know of no surer way of killing mealy bug, red spider or scale than by using a solution of one part nicotine to forty parts methylated spirit. If you use one of the small bottles with a small brush in the stopper as used for nail varnish, etc., you will be able to deal with a solitary bug or so with ease. The solution as a spray becomes a little expensive, and that is why I advise early treatment. If you have to spray a plant, then I think that it is better to use Volck as it will be much cheaper.

If you go away from home on holiday, I think that you will be well advised to leave no well-meaning neighbour or friend in charge of the greenhouse. If you do, you will probably find that the plants have been over-watered on your return. The best thing to do is to leave plenty of windows open all the time, give a good watering before you leave and do not worry about the plants getting any more water until you return. Well shade your young seedlings and, if very small, place in a tray with a little water in, but do not overdo it.

If you wish to take some cuttings from your plants do this now. You will find that as long as the sun has plenty of power the roots will soon form. Make a clean cut with a sharp knife or razor blade, and then leave the cutting exposed to the sun for a few days to dry. You must not insert a cutting into soil or other material before the base has dried. If you do so the cutting will probably start to rot. Once the cut has dried you can place the cutting in the medium you favour most. I do not think that there is a better substance than Vermiculite, the coarse grade. The cutting may need some support. Place a stick well into the pot or pan and tie the cutting to this so that the base just rests on the surface. It is necessary to give a little moisture at times. This can be done by immersing the pan in water so that a little seeps up into the pot. Coarse sand may also be used, but the advantage of using Vermiculite is that the cutting can be easily examined as if roots have formed they will hang on to the medium and bring it up instead of breaking as they may do in other any kind of medium. Once the cuttings have made good roots they may be potted up into potting soil. Be very careful how you do this as the roots must not be broken. Always keep the cuttings in the full sun whilst awaiting the formation of roots.

To conclude my notes I would like to end with a note of warning : when watering seedlings, either in a pan or in pots, be sure that all the soil is damped and not just the top half-inch or so. Good growing.

HUNTING GIANTS IN LOWER CALIFORNIA

By GEORGE LINDSAY

Lower California is a long peninsular separated from the Mexican mainland by the Gulf of California, or Sea of Cortez. It is a territory of Mexico and should not be confused with South California, a state of the United States lying immediately above it. This rocky finger of land stretches southward seven hundred miles and is only about one-tenth of its length in width. It has been separated from the mainland for a long geologic period ; it is questioned that it was ever connected. The prolonged isolation has resulted in the building up of a unique desert flora, with a high percentage of endemics. Members of the *Cactaceae* dominate that flora.

In the title I spoke of hunting " giants " in Lower California, of course, meaning cacti. Travelling southward from the United States and Mexican boundary, the first of the giants to be encountered is near the abandoned English colony at San Quintin. There the northernmost representatives of huge *Pachycereus Pringlei* rear stunted and grotesque arms above the low scrub vegetation of the coastal plain. Farther south, this species is the monarch of them all, forming large forests of immense individuals. Near the centre of the peninsular, there are stands of thousands of these fellows stretching colossal arms skyward and dwarfing the other cactus species growing among them. Few have been accurately measured, but Dr. Ira L. Wiggins, authority of the vegetation of this life zone, has reported numerous specimens as reaching thirty-five to forty-five feet in height, and has published a photograph of a plant near Punta Prieta (Wiggins Ira L. " A giant specimen of *Pachycereus Pringlei* from Lower California," Cactus and Succulent Journal of America volume 3, page 95), which, judging by a man at its base, must be nearly seventy feet tall !

The " cardon," as the Mexicans know this species, rises from a definite trunk, and branches into thick limbs which give the plant structure enormous weight. To support this load, the plant has developed a series of hardwood rods which form a supportive skeleton for each stem. The rods run longitudinally, but are not connected with each other. This system allows the plant to stretch laterally and increase in girth as storage cells become turgid with stored water after every rain. As rains, in this region, are often years apart, the rapid expansion to accommodate the water is most important for the survival of the plant.

Pachycereus Pringlei has various growth forms and these have resulted in the plant having been described under several different names. On Angel de la Guarda Island and Isla Partida, in the Gulf of California, mature specimens may be no more than ten feet tall.

In the Cape Region of Lower California, we find a small representative of the genus *Pachycereus*, *P. pectin-aboriginum*, Cardon hecho, as the natives call it, is restricted to tropical areas and is common along the coast of Southern Sonora and Sinaloa, as well as the tip of Lower California. The plants are not as ponderous as the larger species and are usually found growing up through rather dense spiny tropical underbush. The specific name, *pectin-aboriginum*, is descriptive of the use of the brushy fruits by the natives. The fruits, two or three inches in diameter, are covered with dense bristles. When dried they are used by the Indians of the regions in which they grow for hair brushes. Several years ago, in the region of Alamos, Sonora, I noticed my guide carefully selecting several large fruits of this species and, knowing they were not used for food, I asked him why he picked them. He replied that his daughters had asked him to bring home some hair brushes ! He explained that the fruit of " cardon hecho " was not only used by the natives in the hills, but also by the " gente de razon " of the cities. He chose fruits that were growing close together along the plant stem as they had flattened areas where they were pressed against each other. These made fine little flattened places for the comb to be held.

Cardon hecho has several other uses. The seeds of the fruit are ground and used as meal. Also, sections of the stems are often cut off in six- or eight-foot lengths and placed upright in the ground to form fences or corrals to confine stock—the structure somewhat resembling the upright log Indian forts once erected in Canada. The barricade soon outgrows this resemblance, though. Every stem grows, and in time the fence may be twenty feet tall !

Ordinarily, *Pachycereus pectin-aboriginum* grows as rather scattered individual plants, sometimes thirty feet tall and with a trunk two feet in circumference. The tips of the branches often bear large cristate growths. One

plant I saw in Sinaloa had two dozen crest growths of enormous size, any one of which would gladden the heart of a fancier of these growths !

Another giant cactus is to be found growing on some of the islands in the Gulf of California. This is the largest of the barrel cacti, *Ferocactus Diguetii*. Some eighteen species of barrel cacti, or *Ferocacti*, have been described from Lower California, but this is by far the giant of the genus. It was first discovered by Leon Diguet, the French naturalist, when he visited Catalina Island to investigate the pearl fisheries there, and was named in his honour by Weber in 1898 (Bulletin de la Museum de Histoire Naturelle, Paris, vol. 4, page 100). In 1911, Dr. Rose found the species on Carmen, Cerralbo and Catalina Islands. I was anxious to collect the huge species, but hard luck seemed to prevent my finding it. In the first place, the islands in the Gulf are very difficult to visit. While spending the summer of 1938 cactus hunting in Lower California, I had attempted to get transportation to, first Cerralbo, out of the port of La Paz, but the Captain of the Port refused sailing papers to any boat available for charter. At Loreto, I arranged for turtle fishermen to take me the few miles to Carmen Island, but again the Port Captain considered the trip too dangerous for him to clear. Finally, in 1948, I made a survey of the Gulf Islands with friends in a yacht. We found *Ferocactus Diguetii* on Carmen Island, but they were not the huge specimens we expected to find—rather were only three or four feet tall ! Danzante Island was barren, though the species had been reported from there, but we did locate one small specimen on Monserrate, though it was not expected on that island. Finally, though, we arrived at Catalina Island, which is still so little known that no charts show its shape, and from the yacht were thrilled to see gigantic barrel cacti all over the barren rocky hills ! Hurrying ashore, we at last found the giants ! Huge golden spined *Ferocactus Diguetii* grew almost to the waterline ! The plants were in flower, the flowers almost hidden among the long golden spines at the top of the plant. Later, on Cerralbo Island, we found more of the giants, but not as large as those on Catalina. The original description mentioned plants four metres tall and some that we saw were surely that large. The root system of this species is shallow and the large plants often topple over from their own weight, but continue to grow and flower stretched prone on the ground. *Ferocactus Diguetii* is one of the most attractive of the barrel cacti. Young plants on Catalina Island looked very much like small plants of *Echinocactus Grusonii*. Specimens are very rare in collections, but seeds that we collected may make them available.

We have considered the three " giants " that are at home in Lower California. There are many other large growing cacti, but those listed are the largest and most impressive of the over one hundred species found on the desert peninsular.

(In regard to *F. Diguetii*, it is interesting to note that although Weber described the plant in the Paris Bulletin in 1898, the species was not mentioned in Bois' Dictionnaire d'Horticulture Illustre in which Weber described many cacti, including some original descriptions. He does not give a single *Ferocactus*, listing them all under *Echinocactus* —*Ferocactus* was not then known as such—and *F. Diguetii* is not even under the *Echinocactus*. In the Paris Bulletin the plant was described as an *Echinocactus*.—Ed.)

REVIEW. It is with great pleasure that we are able to announce still another book by Mrs. V. Higgins. We all admire her extensive knowledge and, even more important, the facile way in which she gives it to her public. The new book is " The Cactus Growers' Guide," published by Latimer House Ltd., in their New Gardening Series, price 7/6. It is a cross between her well-known " Study of Cacti " and her book, with Dr. Marrable, " Cactus Growing for Beginners." It is a very readable and informative book, covering what is a cactus, where they are found, the different types of cacti, their cultivation and propagation. A section is devoted to succulents, so that it is a very valuable *vade mecum* which will be an interesting and pleasant addition to her previous publications. It is a book needed by all cactus enthusiasts, and will enhance their interest in our plants.

Dr. H. Tischer, part author of Mesembryanthema, of Wallgraben 67, Stuttgart-Vaihingen, Germany, would be glad to get into communication with collectors of *Conophyta* especially. Those interested should write this eminent student of our plants direct.

MAMMILLARIANAE

Addenda by J. PINCKNEY HESTER

Dr. Craig, in his introduction to " Mammillaria Handbook," says : " The shape and other characters of seeds may be a better basis for the grouping of the species than that based on the morphology of the other parts of the plant, but inasmuch as all these data are seldom available to the average collector, it has not been used herein."

Evidently, Dr. Craig was well along toward the inevitable conclusion that each separate seed shape displayed by the various groups of *Mammillaria* is the immutable hallmark of a separate genus, as it is in the other divisions of Cactaceae.

Genus *Mammillaria* could have been retained only by making sub-genera of all the groups of species with distinctive seed patterns.

The only discordant note in the seed shape song, is confined to *Echinocactus*, and it may be harmonised by assuming that it may contain several sub-genera, some of them monotypic.

The generic seed shape concept extends even to *Opuntieae*, but not always in such precise unmistakable patterns as those exhibited by members of the other Tribes of Cactaceae.

Hybridism always blurs patterns, as it has in many species of both *Cylindro* and *Platyopuntias*.

O. acanthocarpa in Central Arizona and *O. versicolor* and *O. spinosoir* near Tucson, Arizona, are hybrids, as proven by the fact that plants with different coloured flowers of the same species, have often fruit of different sizes and with different seed patterns.

You will find nothing in Cactacean bibliography noting the hybridism of the three species of cholla listed above, which goes to prove how describers and the more important of the botanists have failed to see and understand seed patterns—the most basic of all cactus characters.

Herewith are reproduced some 12.5x photographs of several species of former *Mammillaria*. Too few different seed shapes are shown because not enough seeds were available, even from a seed dealer in California.

M. Wrightii, Wilcoxii, viridiflora and several spec. nov. evidently belong to the same genus. As all are soft, flabby cacti, *Mollicactus* or *Flaccidia* might be appropriate generic names to choose from.

A large group of " pincushion " cacti, usually with milky juice, including *M. Heyderi, applanata, sphaerica, Macdougalii*, etc., are members of the same genus, for which *Craigia* would be a fitting name.

This old Field Observer expects soon to name and describe several dozen new species of many genera of Cactaceae, which makes him reluctant to name the new genera of *Mammillarianae*, as his ego does not itch to the extent that the only relief is the balm of publicity.

(Mr. Hester has sent us several photographs, as mentioned in his article, but, unfortunately, they are not clear enough for publication.—Ed.)

The visit to Kew took place on May 27th, when the members met in the No. 5 Succulent House, and visited the various points of interest. The Kew authorities were good enough to put Mr. Farden's collection of *Haworthias* in the South African House for our inspection. Afterwards tea was served, outside the Gardens, to those present. The weather was kind to us and we all spent a very pleasant afternoon, and there was a very enthusiastic vote of thanks to Mr. P. V. Collings who had the arrangements in hand and acted as M.C. throughout.

CRASSULA LYCOPODIODES, LAM.

By H. HALL

Every succulent enthusiast is familiar with this common plant with its densely leafy, evergreen, branching habit, so I shall not waste space with a formal description. Because it is of easy growth, pleasingly green at all times, readily propagated by cuttings, it has its uses in a general collection. Several distinct forms are frequently met with in cultivation, some very slender, others compact or with oddly contorted stems. Its flowers are so insignificant and minute that they are often never noticed at all.

During the past two years I have come across this little plant a number of times in the wild state, in varying situations, it having apparently, a wide distribution in Southern Africa. Several distinct forms or varieties are also met with from time to time. Yet, I have never seen it occurring other than as solitary fragments, and it generally prefers the more arid, stony regions.

On the Little Karoo I have found it invariably lurking beneath some spiny shrublet, its stems inextricably mingled with those of the bush which provide some measure of protection from the hot sun and winds. It endures the severe droughts as happily as the rest of the karooid vegetation. There, its colour is a dull, purplish-green to grey-green. The yearly rainfall may be as low as five inches, but it must also be remembered that this small amount might be precipitated in a few hours, or a day or two at the most, and that the situation is such that most of it has drained away very shortly afterwards, followed by many months of cloudless skies.

Travelling due north of Cape Town, the plant may be met with occasionally as far as the Orange River, some 500 miles away, this route traversing Little Namaqualand with its numerous stony, arid hills, which are so rich in rare succulents. Looking a little more sun-burned and desiccated, still selecting the rocks and shrubs for protection, our little *Crassula* has to endure even worse droughts than those on the L. Karoo. East of L. Namaqualand lies Bushmanland which is a vast region of desolate, sandy plains, broken by fantastic ranges of hills, a land of low rainfall and great extremes of temperature between night and day. Here, too, I found the plant, still as the most solitary and scanty of species. And in Northern Bushmanland I came across a few plants far up a mountain slope but in full exposure, just to prove, I suppose, that it does not *always* grow under a bush. These specimens had formed neat, compact tufts some six inches tall and wide for they had nothing to support the stems. Bleached quite yellow with exposure, the tips orange-brown due to their minute flowers. They were quite dry and very brittle, but far from dead. In this particular spot they shared the terrain with *Lithops olivacea* and several rare *Anacampseros* spp. We were informed hereabouts that it had not rained for three years and I mention this to stress the drought resisting qualities possessed by our little *Crassula*.

A few weeks ago, plant-hunting in mid-summer—which, I might add, is far from pleasant—I came across a specimen of *C. lycopodiodes* near Clanwilliam, at an altitude of about 3,000 feet and which was worthy of a photograph. The specimen was about ten inches tall, sprouting from a fissure in the rock and, from a purely horticultural point of view, the healthiest example I have met in the wild. From about noon the plant would be in partial shade from the surrounding shrubs seen in the background. On that particular day, January 18th, the shade temperature was around 110 degrees F., which is not abnormal for that area in January.

Hunting for succulents is immensely fascinating and the vast number of species of all kinds supply abundant interest, but whenever I come across *C. lycopodioides* in the wild state, my mind travels back to the emerald-green specimens in English greenhouses, and especially to one commercial establishment where literally thousands of plants filled entire houses. I might add that all these wild forms I collect for distribution records turn the same healthy green under glass at Kirstenbosch, not that it needs such protection here, of course.

To me, the most singular happening with *C. lycopodioides* took place just before the last war, when I noticed a single shoot was producing variegated leaves on a plant in my care in Manchester. From this one shoot a stock was raised which retained the variegation fairly constantly, and I believe it is pretty widely distributed now. The mother plant did not mutate again and all enquiries failed to discover that it had ever happened before. This chance form becomes suffused with pink and is most attractive, and I now have specimens of it with me in S. Africa from whence its ancestor originated, perhaps three centuries ago.

MY FAVOURITE PLANTS

By Mrs. M. STILLWELL

To begin with, I do not specialise in any particular genus, but prefer something of everything if it so takes my fancy, although I must admit I have a great leaning towards the stemless *Mesembryanthemums*.

In my steel greenhouse I keep all these and all the sun-loving plants, as they get every available bit of sunshine there is. I never shade anything in either house, I maintain this is quite unnecessary, providing correct watering of each individual plant is observed.

I have now to mention my favourite plants. I have so many that it is no easy task, but the following few spring quickly to my mind and seem to stand apart from the others.

Euphorbia obesa, which is just coming into bud, reminds me of a cricket ball, and is about that size, its beautiful markings are a joy to see. I very seldom water it and when I do, it is always from the bottom. Continuing with the *Euphorbias*, *E. bupleurifolia* is a little gem, with its bunch of green leaves on top, this does not like too much sun as the leaves lose their fresh green look. *E. squarrosa*, with the long " carrot root," is also very interesting and blooming this year for the first time. Before leaving the *Euphorbias*, I must not forget to mention *E. splendens*, the " Crown of Thorns," which, at present, has a fine display of red " flowers " (the flowers are really very small and the red " petals " in reality are the bracts).

Many of the *Crassulas* are exceptionally interesting, especially *C. teres*, which, to me, is a real work of art, also the beautiful little white *C. corallina*, which many find it difficult to get through the winter. In summer it can take a fair amount of water. *C. rupestris* and *C. montis draconis* provide a fine show of pink flower heads at Christmas and early spring ; they have quite a strong scent. It is always a great thrill to me when *Rochea falcata* comes into bloom. I think this is one of the finest heads of flowers produced on any succulent, and one plant can scent a whole greenhouse.

A few of the *Aloes* also claim my attention, especially the dwarf *A. humilis* with its spikes of orange tubular bell flowers. This is a very slow grower and, therefore, takes up little room. *A. striata* is a beautiful plant with pink ribbon edges, likes plenty of water and not too much sun. *A. Greenii*, the bright green spotted *Aloe*, always catches the eye.

Agave filifera has always been a great favourite, all the leaves appear to have strands of white cotton attached, and a mature plant is very handsome.

Aeonium tabulaeforme, like a flat table top, is very beautiful when well grown. Unfortunately, when you have grown a plant to perfection, it decides to bloom and, of course, the whole rosette dies and one has to start again from an offset, if any. The prettiest *Aeonium* of all, the little dwarf *A. sedifolium*, is closely compact and with beautiful markings. The leaves are often very sticky.

The poor old *Bryophyllum tubiflorum*, despised by many, can be a thing of great charm when grown generously and allowed to bloom. I have a specimen about three feet tall and right at the top is a cluster of fiery orange flowers that look grand in the sunlight.

What could be more exquisite than some of the *Cotyledons*, particularly *C. undulata* with its wavy edges and delicate leaves—one touch and they are ruined.

The *Kalanchoes* provide a few really outstanding plants, such as *K. tomentosa* with its beautiful silky leaves and chocolate markings, known in America as the " Powder Plant." *K. granata* is a very handsome plant with thick, deep red, crenated leaves. It provides a wonderful contrast in colour to the *Echeverias*.

Echeveria metallica is such a beautiful colour that it cannot help being a favourite. The furry *E. pulvinata* is very attractive, and in the autumn the edges of the leaves turn red.

A few of the *Kleinias* come to my mind as pet plants, namely, the beautiful blue *K. repens* which likes plenty of water in summer to reach its true perfection. *K. tomentosa* with its white felted leaves is a real classic ; this plant is also rather difficult to get through the winter as most of its leaves shrivel and drop, but usually plenty of new growth comes along in the spring and we breath again.

I have one corner of my not-quite-so-sunny greenhouses devoted to *Stapelias*. In spite of the evil smell, one

must admit that the beauty and structure of most of the flowers surpass any of the other succulents for detail. *S. hirsuta*, *S. grandiflora* and *S. asterias* are among the hairy types which are outstanding. *S. variegata* and varieties are always a source of admiration. *Huernia hystrix* with its spring flowers is very quaint, and *H. primulina* with its clusters of yellow flowers is a very free bloomer.

I have a plant of *Hoya carnosa*, known as the wax plant, which is climbing up to the roof, and in the summer provides most beautiful clusters of pure wax pink flowers which have all the appearance of being a spray of artificial flowers used by a milliner for hat trimming.

As I variably must, I come to the stemless *Mesembryanthemums*. Of course, my first favourite is *Fenestraria aurantiaca*. This plant has lovely yellow flowers at the end of the summer. It is a window plant and, therefore, needs careful watering and a sandy soil. The *Lithops* are all favourites, especially *L. Fulleri* and *L. pseudotruncatella*. Do not water these plants until May, when the old skin should be ready to come off. The *Gibbaeums* are particularly interesting as they have so many different forms. *G. pubescens* is a very handsome white plant with bright cerise flowers in March. *G. velutinum* has beautiful large pink flowers which open daily for quite three weeks. *Argeta petrensis*, at the present time, has fourteen flowers out, of the same colour as *pubescens*. This plant has a great tendency to shrivel with me during the winter and takes rather a long time to recover, but it does not seem to affect the supply of flowers which begin to form when still in the shrivelled state. Who could resist the *Titanopsis Argyrodermas* and *Dinteranthus*?

I could continue on for much longer here, but must now turn to the cacti as I have my favourites there, too. The old *Ariocarpus fissuratus* is very quaint. It changes colour with the weather. On dry days it is a lovely whitish grey, but on damp wet days, it takes on a dirty orangey colour. I have noticed this repeatedly.

Mammillaria plumosa, like a little bunch of pure white feathers, is one of the most beautiful things I have ever seen. *M. bombycina* is another plant with great charm.

Most of the *Rebutias* give me a great thrill of satisfaction when they bloom, particularly *R. violaceaflora*, a colour which has to be seen to be believed.

All the *Lobivias* are worth having as they bloom so well, especially *L. costata*, *L. pentlandii* and *L. aurea*.

Echinocereus Fitchii is one of the best with pink spines and very large pink flowers. *E. Berlandieri* is another free bloomer, together with *E. pentalophus*.

Wilcoxia Poselgeri has fine pink flowers with a hawthorn scent, mine has nine buds this year.

The pride of my collection are the white, hairy, and woolly *Cereus*, namely, *Cephalocereus senilis*, *Espostoa lanata*, *Pilocereus Trollii* and *Oreocereus Celsianus*. They need careful watering as an over excess is liable to cause rot.

I have a large *Harrisia Bonplandii* which is, of course, night flowering, and last year produced its first large white flower, eight inches across, with a very strong scent. It was a great thrill.

Opuntia strobiliformis is a rare little plant with the appearance of a pine cone. *Opuntia papyracantha* with its " paper " spines I am also very fond of.

Parodia Maassii with its fierce hooks is a fine plant, but I am still looking in vain for its flowers. A shy bloomer, I believe. *P. nivosa* is a pretty plant with glassy white spines.

I hope this little description of my plants has given as much pleasure to the reader as the plants themselves give to the owner.

The Bucks and Berks Branch of the Society, as already mentioned, has succeeded in arranging a class, restricted to members of their branch, for cacti and succulents. There are ten classes covering both cacti and succulents, the first prizes being 5/- per class, 3/- for seconds and 2/- for thirds. We wish them all success in their venture, and we trust it will be possible to continue the feature and that it may, next time, be open to others than the members of their branch. It is so important that our plants should be adequately brought to the notice of the general public.

Mr. H. Hall points out to us a missprint in his article in the January issue. The plant he was describing should have been printed *Pachypodium* namaquanum, not namaquanam.

STEMLESS MESEMBRYANTHEMUMS—contd.

By G. G. GREEN

The sunshine of the last few weeks has been enjoyed to the full by the *Mesembryanthemums*, encouraging them to produce their lovely flowers, and to new growth.

Frithia pulchra has been very pretty with the bright carmine flowers, contrasting with the yellow-cream flowers of the *Corpuscularias* and *Delosperma* which are still in bloom. With only half a dozen plants of *Frithia*, planted close together, the effect is most charming as the blossoms last quite a long time, almost three weeks, and the vivid splash of colour against the limestone background is very arresting. Even with the counter attraction of the *Rebutias*, *Lobivias* and *Echinopsis*, these flowers remained serene and commanding.

The *Pleiospilos*, described last time, should now be in robust growth, and next to these, I suggest the *Glottiphyllums* as they require very much the same treatment. The soil, however, does not want to be rich or the leaves will grow out of all recognition.

Mr. H. Jacobsen, in the January issue, described these plants very clearly, so there is not much point in my repeating his remarks on cultivation, etc. I would like to point out, however, that, as in the case of most other succulents, including cacti, the cross fertilisation of species produces seed which is, in most cases, untrue to name. The differences, in a great many cases, are not obvious to the untutored eye, though there are exceptions where the resulting seedlings are greatly different from the parent plant. Most amateur collectors who collect their own seed, do so for the pleasure and excitement they derive from raising their own plants, and are quite delighted with the results, irrespective of the fact that the plants may be cross-breeds. They do not take any special precautions in assuring that there is no cross fertilisation and though they probably spread their surplus plants amongst friends, the number is, I should imagine, very small. Only the bona-fide professional growers take the trouble to ensure the pedigree of their plants, and are usually to be trusted in giving plants their correct names, and in growing them under correct conditions. The fact that many species, of both cacti and succulents, amongst private collections are not true to the names they bear, does not mean that there are no longer true species of those plants in the country. It does, however, encourage the keen collector to take more interest in the actual appearance of his plants. As I have repeatedly emphasised in past articles, succulents, including cacti, should be grown as near to natural conditions as possible in order that the true appearance can be appreciated. This does not mean, of course, that shrivelled, half-dead specimens are to be tolerated on the plea of looking "natural." The plants should be robust, healthy and "growing" except in the resting period, but even here they should look healthy. Forcing, especially with cacti, so that flowers are produced quickly, is in my opinion, unworthy. A healthy plant needs no encouragement other than that of the seasons, to produce foliage or flowers at the right time.

Flowering during June and July are the *Stomatiums* which, whilst not exactly stemless plants, are practically so until a few years old. They look somewhat like small *Faucarias*, have very small teeth on the edges of the leaves and a roughened tuberculate surface grey-green in colour. During the growing period, which coincides with our own summer, they can take liberal helpings of water, though they need very little in winter. The flowers are produced on very short stalks, feathery with narrow petals, yellow and cream. When not being grown in the "garden," they will look much better if small pans are used instead of pots, the surface of the soil being sprinkled with broken limestone. Propagation is easy by cuttings from parent plants, as they can be inserted straightaway into the compost and lightly syringed.

The easiest species to grow are, perhaps, the following :—

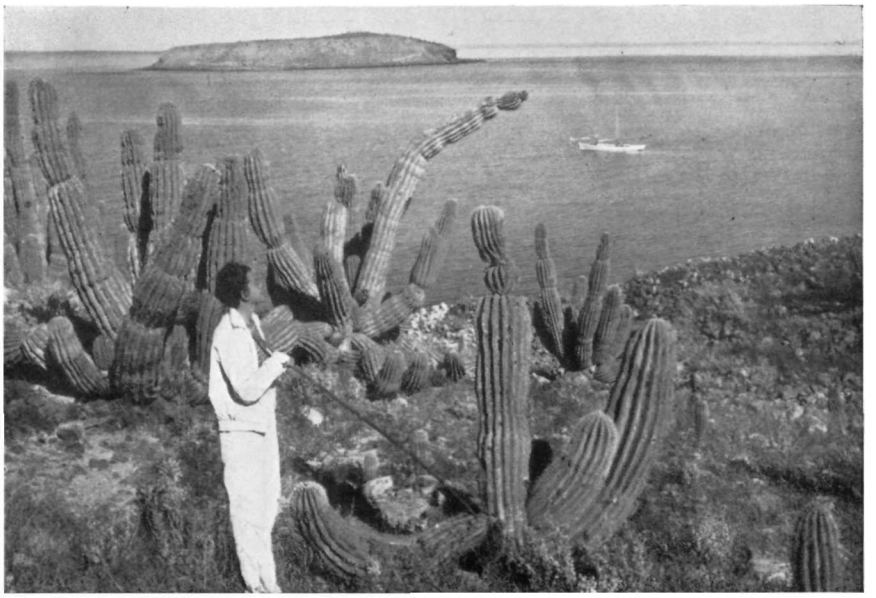
St. agninum, one of the largest species, growing more or less erect with roundish, pointed leaves, keeled on the back and only a few teeth.

St. albo-roseum, compact, quick growing with small leaves similar to *Titanopsis setifera*. Flowers are pale cream at first, turning white when opened.

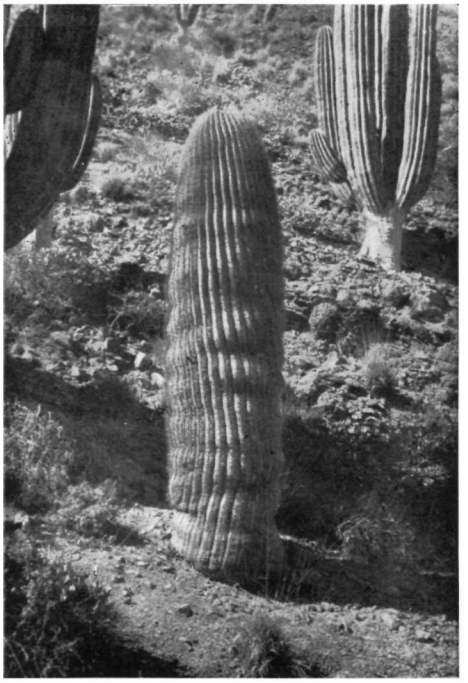
St. ermininium, very small leaves growing closely packed and very rough. The yellowish flowers have a faint sweet perfume.

St. Fulleri, one of the best known. Grows quickly spreading with age. The leaves are more green than the preceding, with smoother surfaces, the flowers pale yellow.

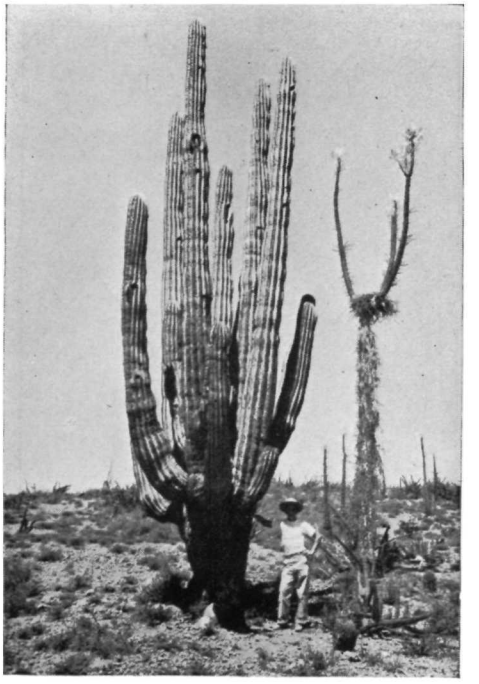
St. suaveolens, soft, small fat leaves, light green turning reddish colour.



Pachycereus Pringlei. Isla Partida, Gulf of California G. Lindsay



12-foot *Ferocactus Diguetii.* Santa Catalina Island, Gulf of California G. Lindsay.

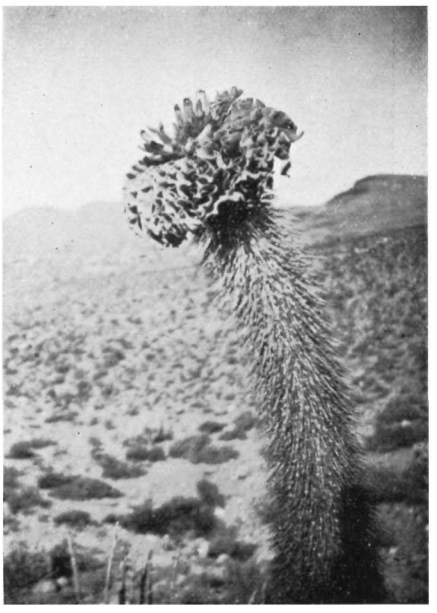


Pachycereus Pringlei.
Rosario, Lower California G. Lindsay

Rebutia violaciflora. Three-year-old seedling. A. Boarder

Mammillaria bocasana A. Boarder

Crassula lycopodioides H. Hall

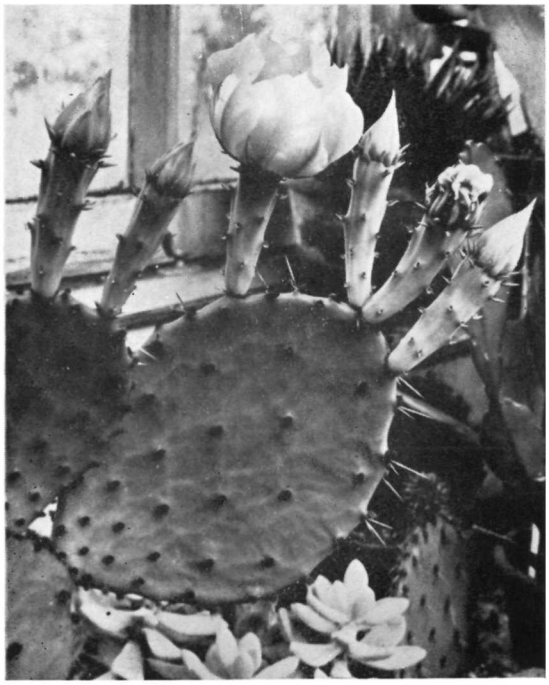


Pachypodium namaquanum. Showing crown of leaves and tubular flowers in the centre. H. Hall

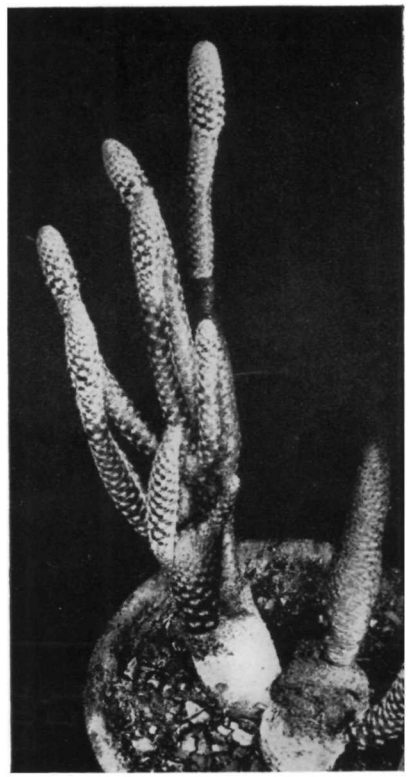
4-foot *Euphorbia dendroides*. J. A. Janse

Euphorbia dendroides and *Agaves*. Amalfi, South Italy J. A. Janse

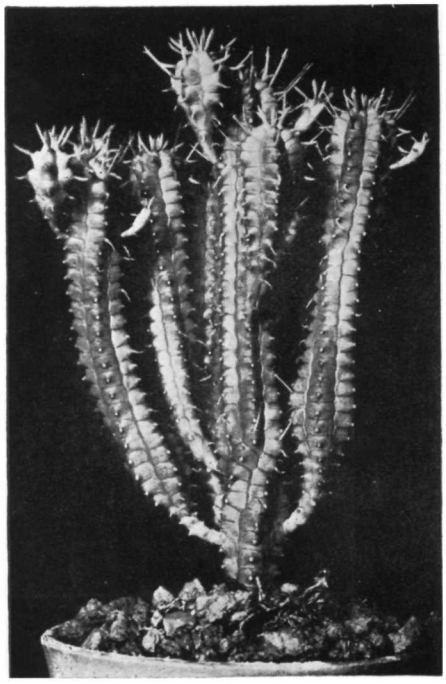
Euphorbia dendroides.
From P. A. Matthioli, "Commentarii in Dioscorides" (1588 : p. 608).
J. A. Janse



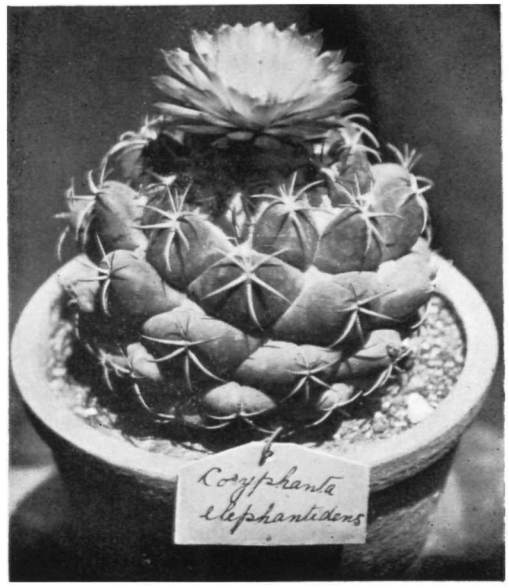
Platyopuntia tenuispina (?) J. R. Topham



Opuntia clavarioides Dr. E. Elkan



Euphorbia submammillaris Dr. E. Elkan



Coryphantha elephantidens A. Bugeja

Another easily grown genus of stemless *Mesembryanthemums* is the *Hereroa* from South West Africa. These plants are upright in growth, quickly forming clumps of soft, fairly long leaves, almost triangular in section. The surface is roughened with raised dots, the tips curving inwards slightly.

The growing period begins in late spring and continues throughout the summer, when plenty of air and light can be given and liberal helpings of water. The flowers are borne on stems in clusters, yellow and pale orange in colour, late spring, and early summer. They are very handsome plants when in bloom and should be included in the collection.

Hereroa carinans, granulata, hesperantha, Nelii and *Rhenaltiana* are the best and easiest to grow, the last named being the biggest species.

The *Faucarias* hardly need to be described as almost everyone, I should imagine, has seen specimens of this genus. Though not entirely stemless, they remain so for such long periods that they may be included here amongst the really stemless species. They are very hardy and attractive plants, enduring extremes of heat and cold and extended drought with great equanimity, producing their bright yellow flowers annually with great profusion and regularity. The three-sided toothed-edges leaves are most interesting, giving rise to the name "shark's mouth."

Easy to grow, the plants can be propagated either by seeds or cuttings, needing the ordinary soil mixture described previously, and a sunny position in the greenhouse or house window. During the winter, they can take light watering, and as much air as possible during the summer. The species differ slightly in appearance, some with tubercles on the surfaces, others with more or less teeth along the edges and some with curving leaves

The following list is varied enough to offer species embracing most of these variations :—

F. albidens, small, glossy green leaves, dotted with white and a few whitish teeth.

F. Bosscheana, short narrow leaves, green with whitened edges and few long teeth.

F. Brittenae, leaves close together, broad with drawn tips, greyish green, dotted and a few teeth ending in fine hair-like tips.

F. Duncanii, close packed, very narrow leaves keeled and dotted red. Curving teeth with fine tips.

F. felina, long leaves with broad, fleshy teeth and long fine tips.

F. Haagei, similar to *F. Bosscheana*, edges of leaves whitened with very few, if any, teeth.

F. lupina, longish narrow leaves, dotted ; curving teeth with spiny tips.

F. militaris, crowded short leaves, narrow, keeled and curving inwards.

F. tigrina, well-known plant, leaves crowded, broad and dotted, with curving teeth.

F. tuberculosa, thick, much tubercled leaves.

A very free flowering genus is the *Bergeranthus*. These plants are stemless with long, thick, triangular shaped, tapering leaves, dark green in colour. They are quite easy to grow, requiring plenty of water in summer, and a little in winter. The flowers are borne on long stalks, two or three at a time, bright yellow, in summer, and last for a long time. They close during the night opening towards the afternoon. The few mentioned here will represent the genus :—

B. lanceolata, short, dark green leaved.

B. multiceps, growing thickly in clumps, leaves slightly curved.

B. scapiger, very similar to above, with flowers on longer stalks, opening one after the other.

B. vespertinus, small, greyish green leaves, narrow and rounded. Flowers on short stems.

The "garden" or the general collection could not be complete without the *Lithops* and *Conophytums*, which are, without doubt, the most interesting of all the *Mesembryanthemums*. They are much too important to be described briefly, and I will leave them for a future article, except to say, that the *Lithops* should now be free of the old skins and showing the new bodies which will need liberal waterings to encourage good growth.

A REPLY TO Mr. UITEWAAL

By G. G. SMITH

In your Journal, January, 1949, Mr. A. J. Uitewaal criticises some remarks in my article " Views on the naming of *Haworthias*," but passes over the glaring instances I gave of careless work.

He writes :—" the history of science generally, or of any branch of science, is often regarded by certain students as an amusing, or even interesting tale of errors and blunders." Does he agree with the publishing of descriptions and photographs of plants so distorted through being in a parcel for a month or more that it is quite impossible to determine the normal plant ? Does he agree with the method of making up " fairy tales " when the facts are unknown, but can be ascertained ? These are not errors or blunders, but shoddy work. Or does he agree with Dr. Resende (Port. Acta Biol. 1949 : 5). " There is not the slightest doubt that, however great the deficiency of the initial description, in a short time the universal recognition of the strain was much more perfect, due to all the possible criticism and improvements, than what occurs with the strains described up to the present date by Mr. G. G. Smith." In other words, that my taking time to study the plants, photographing and describing them only when in a healthy and normal condition, even waiting for them to flower, is not necessary. A truly extraordinary attitude to adopt.

Mr. Uitewaal continues " This is all that can be found in Smith's article on the supposed ill effects of Von Poellnitz' work on the state of knowledge of *Haworthia* but a good number of lines are devoted to such irrelevant points as the space of time it took Von Poellnitz to draw up the diagnosis of a form he intended to publish as a " nova species." So Mr. Uitewaal considers that the points I raised about (1) *H. Venteri*—a description and photograph of a very abnormal plant and (2) *H. Parksiana*—and the fairy tale, are irrelevant ? It seems to point to Mr. Uitewaal agreeing with Dr. Resende's statement.

Mr. Uitewaal then refers to my criticism of Mr. Farden's work. Mr. Uitewaal's question as to why I should use certain characteristics and object to Mr. Farden using them, is very easily answered. It is not a question of merely using the characteristics, but how and when to use them. In your Journal, 1939 : 34, Mr. Farden, in regard to the forms of *H. attenuata* he published, writes :—" through searching in all sources, in Europe and S. Africa, I have got together others as well, as specified below." Again, 1948 : 41, he writes :—" It may surprise some how it was that I was able to find and describe twenty varieties of *H. attenuata*, since to obtain them is so difficult. Well, I found I had three varieties and C. D. O'Donoghue had two more which he gave me, so that excited me, and I said I would make a special effort to see how many I could find. The predominating feature of the species is the line of tubercles down the middle of the face of the leaf. I broke up a plant and sent a leaf to all the dealers I knew, asking them to send me specimens of any they found in their stock with the special feature, and if slightly various send those as well. I sent the leaves to four dealers in England, one in Belgium two in Germany, one in Italy, and two in South Africa. In due course, I received some fifty plants. I then proceeded to examine them very carefully and discovered amongst them fifteen more varieties, which made twenty in all. I then described them and published the list in our Journal, December, 1939." The above, Mr. Uitewaal, is the answer to your question. To answer it a little more fully, I would mention that to enable me to describe and publish new species and varieties in this very polymorphous genus, I do not write to dealers for plants which, incidently, will in many cases be hybrids, and are mostly, if not wholly, without locality. I study my plants in the field and in my garden and my drawings, photographs and records are accurately and scientifically prepared, and I do try to avoid " errors and blunders " by recording facts and eliminating guesswork.

Let us now examine briefly Mr. Farden's work (1939 : 34—38), the work which Mr. Uitewaal is comparing with mine. Mr. Farden writes :—" to economise space I have been obliged to draw the shape of the leaves more or less all alike, though retaining the exact disposition and size of the tubercles." *Haworthia* leaves are, as most of us know, somewhat variable in size and shape ; nevertheless, these are important characters, and any scientifically minded person would draw them to scale, especially when a number of leaves are shown together for purposes of comparison, as in this case. Looking at Mr. Farden's figures of the leaves, one has no conception of the shape or size. For instance, leaf No. 1 should, when compared with the length, measure 11.5 mm. wide, not 7.5 mm. as figured, and the shape is quite incorrect. Likewise, leaf No. 2, for the length figured, should be 18 mm. wide, not 8 mm. How unscientific ! However, he gives his reason for not drawing the leaves full size, but emphasises that he has retained the exact disposition and size of the tubercles. Having read this statement, it is interesting

to note that of the eleven pairs of leaves drawn by Mr. Farden (in 1938, p. 67), none agree in tubercle disposition with those of the same form in 1939 : 35. It seems, therefore, that if Mr. Farden today drew the leaves of the nineteen varities and forms now quoted by him, they would look so different that on the basis on which he separates forms, he would have another large number of varieties and forms to add to his list. Let me now refer to the tubercles on some of the nineteen pairs of leaves shown, the exact disposition and size of which have been retained by Mr. Farden. Regarding tubercle size, those on the back of leaf No. 1 are in .75 to 2 mm. broad bands, yet the description gives 1 mm. broad bands. Regarding disposition, leaf No. 2 shows twenty distinct bands of tubercles which, according to the description are 2 mm. apart, This means that the bands of tubercles occupy a space over 4 cm. long. Allowing for the tip and base, which are not tubercled, we have a leaf at least 5 cm. long, yet the description gives a length of 3—4 cm. Likewise leaf No. 16 shows a row of tubercles which, at 2 mm. apart, makes a leaf length of a little over 3 cm., yet the length, according to the description, is 5—6 cm. Now Mr. Uitewaal, was it this sort of thing you had in mind when you wrote your first quoted remark ?

Other examples of " errors and blunders " are to be found in your Journal, 1948 : 41. Here Mr. Farden writes : " they (*Haworthias* and *Astrolobas*) grow on and around the Great Karoo Desert, a little to the north of Cape Town ; they are extremely local, hardly any two species are to be found in the same area." Actually, there are very few, *Haworthias* and *Astrolobas* north of Cape Town ; their distribution extends practically right across the Cape Province, most species occurring between East London and Caledon, where in places two—four are often found growing together.

Mr. Farden then goes on to mention the varieties of *H. attenuata* he described, named and published in your Journal, December, 1939, and which I referred to earlier. He claims to have described, named and published twenty varieties in this Journal. Actually nineteen varieties and forms were published, and this number includes five which were not named by him, three having been named by Haworth, one by Baker and one by Von Poellnitz.

Mr. Uitewaal explains how variable the genus *Haworthia* is, yet he evidently agrees with the separating of forms on such slight differences as he mentions, otherwise why does he disagree with the remarks I made about splitting.

On page 21, Mr. Uitewaal wrote :— " Seeing that, at present, there is insufficient knowledge of the stability of the vegetative characteristics, I proposed to pay more attention to floral characteristics than has been attempted so far." He then refers to such differences in inflorescences as sturdy-branched and filiform-non-branching peduncles, few and many bracts, crowded and lax racemes, hexangular and triangular perianth base (in cross section). In Des. Pl. Life, 1947 : 132—136, he describes at length " a first attempt to subdivide the genus *Haworthia* based on floral characters." He refers to " the alleged uniformity in the floral structure of the species of *Haworthia*" and says " doubtless he, too, was under the spell of the unanimously proclaimed uniformity of the flowers and inflorescence in the genus." He then refers to his discovery that the perianth base of some species of *Haworthia* is hexangular in cross section, while in other species it is triangular. During the last seven years or so, I have described and published 45 new species and varieties of *Haworthia*, in every case referring to all the characters mentioned by Mr. Uitewaal. Most of these have, from time to time, been recorded by other authors, but I can claim to be the first to record the difference in the perianth base, i.e., the triangular or hexagonal perianth base, and these together with the other characters are being used in my key to the genus *Haworthia*.

The Board of Trade notifies us that cacti may be imported from Holland, France, Denmark and Belgium, subject to import licence, by *bona-fide* nurserymen with a working acreage, but not from other countries. The Board of Trade is also willing to consider exceptionally, applications from cacti specialists who can show that the cacti plants are required for export to the dollar market. Obviously, it is still impossible for specialists, desirous of increasing the knowledge of our plants, to import plants.

MINIATURE GARDENS

By A. H. WILD

Occasionally one encounters that irritating person who, upon being shown a collection of plants of unusual or botanical interest, can think of nothing better to say than to ask the question, " What good are they ?"

Sometimes I encounter this with another question, " What do you grow ? " The invariable answer being " sweet peas " or " roses" ; " and what good do you do with your sweet peas or roses ? " say I, knowing very well that the answer will be " Oh, we use them in the house which is more than you can do with these things." My rejoinder to this is that " I can do quite a lot of good and this is the way of it."

Things are not quite so easy nowadays that one can give as much as one would wish to charities, either local or otherwise but, on occasion, I have been able to present a miniature garden to a local bazaar or sale of work, and the amount they have fetched has been somewhat astonishing. I stand by my amateur status very strictly and never, on any account, sell plants or produce, but I must confess I get a thrill when I learn that my gift has netted quite a substantial sum towards some deserving cause. In this article I propose to give a brief account of the method I use in preparing these bowls.

I was in Torquay for a considerable time and managed to discover some very beautiful rock obtainable in small pieces, and on my frequent journeys home, I brought back as much as I could conveniently carry. The colour of the stone was very beautiful, being a warm reddish brown. I have also been fortunate enough to find a quantity of small pieces of expanded metal and very small mesh wire netting, and this, together with a supply of sand and cement and a pound or so of Cementone, is all that is necessary for making pans of almost any shape or size.

If I am making a special effort, I can usually get a supply of scallop shells from the local fishmonger.

With this equipment and a little skill and a lot of patience, one can produce some very artistic pans that will invariably fetch quite a fancy price.

The procedure is as follows :—mix up about a quart of sand, a pint of cement and one heaped table spoon full of Cementone (red brick colour), making certain there are no lumps by passing it through a fine riddle, add sufficient water from a can with a fine rose to make it into a stiff paste and work it up well with a glazier's knife (sometimes quite erroneously called a putty knife).

From a piece of stiff card, cut an oval, say ten inches by seven inches, next cut another oval, twelve inches by nine inches, from the expanded metal, or very small mesh wire netting. Lay the cardboard oval in the centre of the netting and bend up the overlapping edges all round, but not quite at a right angle, the edge should slope slightly outward, somewhat like a pie dish.

Remove the cardboard, lay it on a piece of wood and cover it with an even layer of cement some half-an-inch in thickness. Press the base of the netting pan into this very gently and then cover the inside of the netting with a further half-inch layer of cement, making one or two drainage holes by inserting small corks.

Next, embed the base of the scallop shells in the cement *inside* the netting rim. The shells should be as uniform as possible, both as regards size and markings and just overlap one another all the way round. It takes some little care and patience to get them set evenly and at the correct angle, but once they are correctly aligned they must not be moved. Next cover the *outside* of the netting with a thin, but even, layer of cement, using the fingers to mould it into a pleasing form.

The next operation is to build up the sides of the pan from the *inside* with more cement, taking care to fill in any spaces between the shells.

This inside layer should be made a little stronger by adding a little more dry cement to the mixture.

Having built up the sides to the desired depth, say three-and-a-half-inches to four inches, put the pan in a cool, shady place to dry, avoid drying out too quickly by spraying with clean water occasionally, say twice daily in warm weather.

After about three days, it will be safe to move it to a table for the final operation, which consists of painting itall over—shells included—with a cement wash made up in the same manner as the original materials, except that sufficient water is added to make it the same consistency as cream.

After a day or two, it will be ready for planting, the corks must, of course, be removed.

To make an oblong or square pan, the procedure is simpler. Make a wooden box, the outside dimensions of which are equal to the *inside* measurements of the required pan and smear it over with any kind of grease ; lay the box, bottom upwards, on a piece of paper. Next make a similar box or cage from the wire netting or expanded metal, making quite certain that the corners are wired securely.

Drop this cage over the upturned box, it should just fit the box, but not so tightly that it cannot be removed with ease. On this cage, build up the sides with cement made up as previously, making quite certain to cover the wire. Dimple the surface either with the finger tips or the putty knife, to give it an artistic effect, these details must be left to the creative capacity of each person.

When the sides are level with the top of the box, or rather the bottom of the box, cover the bottom with a flat layer of cement, about three-quarters-of-an-inch in thickness should be sufficient, leave it to dry in the same manner as heretofore.

As soon as you can do so with safety, turn it right side up and remove the wooden box.

If there is any metal showing, cover this with a thin layer of cement.

It will add to the effect if a dimpled edge is worked on at this stage.

Fill with usual soil mixture and select two or three pieces of rock for the back if possible, these back pieces should stand well up like small flattish pyramids, then plant the back row.

For the next row, use the larger, but more rounded stones and plant.

For the foreground, use the smaller fragments and also insert odd pieces here and there where indicated.

As regards subjects suitable for furnishing with plants, the back row should, of course, receive the tallest, such things as *Crassula lycopodoides*, *C. arborescens*, *C. perfoliata* serve excellently as a background. In the middle foreground, medium sized specimens of *Echinopsis Eyriesii*, or in fact any cacti that are easily procurable by offsets from one's stock plants, particularly the smaller *Opuntias*, such as *O. microdasys* and *O. microdasys rufida*. The immediate foreground is best filled in with subjects that will cover the edge of the pan, such as any of the *Mesembryanthemum* family, *Crassula Bolusii*, etc.

Avoid fast growing plants or those that will attain unwieldy dimensions and thus spoil the balance of the pan.

Such species as *Bryophyllum diagremontianum* or *tubiflorum* are unsuitable as they have a short life and quickly outgrow their quarters. *Kleinia articulata* soon gets out of hand and should be omitted.

Much must be left to the individual, as one is necessarily limited to one's stock of useful subjects and artistic tastes differ.

Personally, I usually keep one or two very large pans, or even seed boxes, in which I maintain a stock of suitable subjects, in order to be ready when called on and, in addition, I have a large number of spare seedlings which come in useful for filling in gaps.

I keep from four to eight seedlings in a small sixty and, at the moment, am holding several hundred two-year *Coryphantha*, *Mammillaria* and *Dolichothele* and a similar number of one-year-old succulents—probably a thousand all told.

From these and bits and pieces from my stock plants, I can always make up a pan or two at short notice.

And that is my answer to the question—" What good are they ? "

Incidentally, I am prepared to give more detailed instruction, if necessary, to any of my readers who may be interested, and to supply a strictly limited number of plants free to support a deserving cause and, of course, I am always willing to exchange, but in no circumstances whatever do I sell any of my plants or pans.

Finally, when you are on your holidays this year, why not keep a sharp look out for highly coloured and well shaped rock or stones, and if you are fortunate enough to discover a good supply of well matched material, box some up and send it home by rail. You will find it very useful for setting out your specimen plants, quite apart from the suggestions set out above.

One last hint : sometimes one finds certain subjects, chiefly succulents, which have a disappointing habit of rotting off from the centre, particularly those which grow in rosette form, e.g., the *Aeoniums*. *A. tabulaeforme* (*Sempervivum tabulaeforme*) is a very bad offender, but if you push them over on their sides and support them with small pieces of rock and pile a few more on any stem that is exposed, this trouble seldom occurs.

NOTES ON EUPHORBIAS (II.)

By J. A. JANSE, F.R.H.S.

(On some species of the sections *Tithymalus* and *Thrucalli*)

Euphorbia dendroides L., Spec. Plant. 662 (1753) ; Sibth & Sm. Flora graeca, t 470 (1806) ; Boissier in DC., xv, 2, 109 (1866) ; *E. divaricata* Jacq. Ic. Rar., i, t. 87 (1781).

We have often pointed out, that succulency in the genus *Euphorbia* is a very gradual one. Some species may be considered as representing a transitional form between the herbaceous and the more extreme succulent type. Such species we know from the Mediterranean, the Canaries and North Western Africa and represent a very characteristic type, similar in habit and in its cycle of life. These *Euphorbias* show a strong periodicity in their growth. Leaves are developed by the beginning of the (autumnal) rains and remain during the winter and spring ; flowering cymes are developed during April—May and are soon followed by the fruits, after which, with the entrance of the dry and hot season, leaves are gradually falling. In the summer the shrubs are fully leafless and bare. Examples of this type are *E. dendroides* L., *E. balsamifera* Ait., *E. atropurpurea* Brouss. and *E. obtusifolia* Poir., to mention only the most important species.

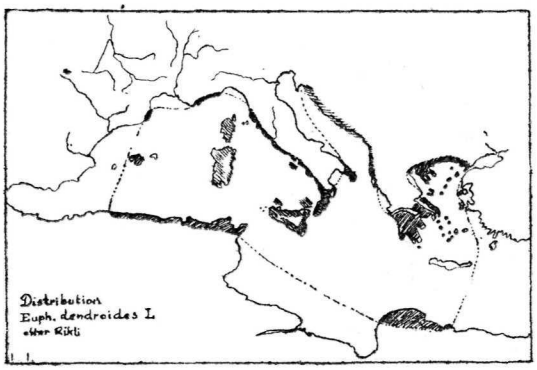
E. dendroides L. is a plant already mentioned and illustrated by many pre-Linnean authors. We give herewith an illustration from Matthiolus (1558). Caspar Bauhinus mentions it in his Pinax (1623) and Dodonaeus gives an illustration on page 372 of his Historia Stirpium Pemptades Sex (1616).

It is a shrub or rarely a small tree, attaining at most 8-10 ft. in height, but mostly smaller, forming round bushes, dichotomously or trichotomously branched. The main stem may attain 6-8 inches ø, with a grey reddish bark. The branchlets are terete, 5-8 mm. ø, at first herbaceous and somewhat glaucous, later greyish and somewhat woody. The young branchlets bear numerous sessile leaves, 3-5 cm. long and 5-7 mm. broad, greyish green, linear-lanceolate. Involucres in 3-10 forked cymes, dichotomously branched, at the ramification with 2-3 broad ovate yellowish bracts ; two similar bracts under the involucre. Involucre campanulate, with 2-3-fid and ciliate lobes. Glands transversely ovate or crescent like, yellow. Ovary on a pedicel exserted from the involucre ; styles united only in the lower third, pistils bifid and somewhat swollen. Capsule glabrous, minutely pitted, three angled with compressed sides. Seeds ovate, compressed with an oblong caruncle.

The distribution if *E. dendroides* is limited to the coast of the Mediterranean. The map (after Rikli) shows the peculiarities of its area. In Spain it has been found only in the extreme north east and it reappears at the mountainous coast of the French and Italian Riviera, the Tyrrenean Coast, including some islands (Capri, Ischia), Sicily, Sardinia, Corsica, the African coast of Algeria and Tunisia, but wanting in Tripolitania, whereas it may be found again after Benghazi. Further, it is found in several localities on the coasts of the Aegean Sea, but it does not occur further eastwards in the Mediterranean.

Euphorbia dendroides L. is a characteristic and most important species of a plant community, very common in the Mediterranean region, the Garigue. Rikli describes the Garigue as a more or less open, 1-2 ft. high (seldom surpassing three feet) plant community of small shrubs, very often bearing etherial oils. The space between these shrubs is occupied by thero- and geophytes. This community is mostly found on a stony or rocky soil, poor in humus, and may be found in combination with, and in transition to another, the so-called Maquis or Macchia, which attains a taller height (4-12 feet) and is mostly less open.

Euphorbia dendroides prefers the rocky coast in the immediate vicinity of the sea and seldom leaves this narrow strip. Only in Calabria did I see it in the interior.



Distribution of *E. dendroides* L. after Rikli
"Das Pflausenkleid der Mittelmeerlauder"
Bd. I, p. 282 (1943)

REPORTS OF MEETINGS

March 21st, 1950 : W. Denton : Succulent Plants from Seed

Now is quite a suitable time to start to raise a few succulents from seed, especially if you decide to keep to *Mesembryanthemums* which are reasonably easy to manage. I believe it is essential that you start early in the year and have bottom heat of about seventy degrees in your propagator. If you can manage about sixty-five degrees you should have some nice little plants by the end of the year. The last two years I have sown my seeds in ordinary five-inch pots with plenty of drainage, either charcoal or limestone grit, giving a good depth of soil for the seedlings to root into and, believe me, they soon reach the drainage. Sow very thinly as you do not want hundreds of plants, only a few for yourself and your friends.

I have used John Innes mixture the last two years with the addition of a little extra sand and lime rubble and have been very satisfied with results. Fill your pots with the mixture to half-an-inch of the rim, then water up from the bottom till all the soil is properly wet, adding a little Cheshunt Compound, without which it is surprising that however careful you are the top soil quickly becomes discoloured with spots of green.

Do not cover the very small seed of *Lithops*, *Conophytums* and kindred sorts ; with some of the *Pleiospilos*, *Euphorbias*, etc., you can gently press them in a trifle, the old rule with reference to all seeds applies here, no deeper than the diameter. Plunge your pots in the propagator and keep close till the seedlings begin to appear in about a fortnight or less, according to the freshness of the seed and the amount of bottom heat available. Introduce a little air directly they are through, otherwise they will damp off very quickly. Cover the glass with a piece of tissue paper to keep off direct rays of the sun, or they will bronze and cease to grow. My own propagator case consists of a copper tank, thirty inches by thirty inches by three inches, with a small plugged hole for filling with water. I made a wooden tray, a little larger and twelve inches deep with a uralite bottom, in this I cut a twelve-inch round hole which I built into the staging and dropped my tank into it. On top of the tank I placed a layer of peat and leaf soil and finished off with ordinary sand compost, giving me a depth of six or seven inches of plunging material. A glass sash is fitted to the top. A paraffin lamp is used for heating, one of those advertised in all the gardening papers, the top of the chimney is kept about four inches away from the copper bottom that shows through the uralite. One gallon of oil lasts at least a week and gives me sixty-five degrees of bottom heat.

When the seedlings are a fair size, or overcrowded, then you must prick them out. In raising succulent seedlings, this, the first shift, is most important. Seeds sown thinly can be dealt with comfortably, turn your pots of seedlings right out, make sure the ball of soil is just right for separating the tiny roots without damage, as if your soil is too wet or too dry you will break a lot of little roots. Use the same mixture as before, just nice and moist, sprinkle about an eighth-of-an-inch of potting sand on the top of the pots. I used a pointed bone knitting needle to make a hole deep enough to take the roots comfortably, drop the small plant in and proceed with the others.

Never try to finish off the top surface with a planting tool, too many roots get broken this way ; when they are all comfortable in their respective holes water them in. They settle down quickly, a little of the top sand washes down and fills the holes nicely. Return your pots to the case and plunge as before, very little water will be required for some time, water your plunging material as much as you like.

Remember, seedlings must have air and not exposed to the full rays of the sun. A little light shading is necessary. *Lithops* are easy to manage and the most interesting, you have in the first year the complete change in the plant body, showing the true markings. It is not easy to flower these plants under three years, but I had two *L. Fulleri* in bloom in two years. Last year I had *Pleiospilos Hilmari*, *Titanopsis calcarea* flowering in two years. The difficult part of growing succulents from seed is bringing them safely through the first winter, an art very hard to explain and can only be learnt by experience.

Lithops will come through kept dry, so will *Argyrodermas* and *Pleiospilos*. *Fenestraria* and *Titanopsis* are very tricky and sometimes require just a little water, it depends on their treatment in late summer, they must have all the light and air possible, and frame treatment suits them. Grow hard is the rule and they will survive the winter. (Owing to lack of space, the report on the meeting of May 2nd, when Mr. Boarder gave a potting demonstration, will be held over for our next issue).

SOILLESS CULTURE AND CACTI

By J. H. KING, F.R.H.S., F.N.C.S.

I have experimented for a number of years in Soilless Culture with success, and have made up many formulas, and have, at last, found a well balanced plant food in liquid form, which I find is suitable to all cuttings and many plants. I have read your Cactus and Succulent Journal and wonder why this method of growing and feeding has not been adopted in the culture of cacti and succulents.

I have had sent, for germination test, several packets of cactus seeds and have had no difficulty in raising them by my method and feeding with the nutrient solution " Kingbro," which is easy to mix and control all the elements as the plants require them.

I prefer growing in small pebbles that will pass through an eighth-of-an-inch riddle.

The first process is to wash the pebbles well to get rid of the sand or clay that may be present ; secondly, place a few pebbles in a test tube and add distilled water (about an inch) to an inch of pebbles, shake well and allow to stand for a few hours, then add a spot of Indicator and watch the colours. If green, then you assume they are on the alkaline side, and you experienced growers know full well which of your favourite cacti love lime. If yellow appears, then you are leaving the alkaline stage, if brown, then you are approaching the acid stage, if pink, definitely an acid stage.

If green, mix one cup of the bottle containing Kingbro to one gallon of water, then take a reading in the same way as stated with the pebbles, shake and watch the colours, you will then know the condition of the nutrient solution, which you can rectify by the application of a little more Kingbro to bring your solution from the alkaline stage to any stage on the acid side.

Should you get an acid reading, then add a little lime water to bring your solution to the alkaline side, or to whichever point you require for your various specimens. To make the lime water, place four ounces of carbonate of lime into a pint-and-a-half of water, then you can add as you require at any time.

Place some large crocks at the bottom of the pot or pan to act as perfect drainage, then fill up with the small pebbles and plant as in the ordinary way, stand the pot in a plant saucer and pour in the nutrient solution to the required height up the pot, which will be kept moist by capillary action, no further attention will be required with the exception of topping-up with solution, as it evaporates. Change the solution once a month; when changing, use the solution to water any plants or grass or vegetables.

It is advisable, once a week, to stand the pot in a deep vessel and allow the liquid to cover the surface of the pebbles. When the pot is lifted out, then the solution lowers, causing a vacuum, drawing in air to the roots of the plant, thus giving three more plant foods, nitrogen, oxygen and carbon dioxide. Once every two months, flush through with clean water to flush out any excess of mineral salts which may have accumulated at the bottom of the pebbles.

The reason for stressing the use of pebbles, is the perfect aeration of the roots, sand and other composts can be used, but they hold too much moisture for quite a number of the cacti family.

Various methods can be used; if growing in a large way, then tanks can be prepared, made of pot, porcelain, or galvanised tin. The only metal I find does not suit most plants is copper containers, as they upset the copper content in the solution.

Kingbro is an even balanced concentrate solution, when using shake the bottle well and add the cap, off the bottle, full of concentrate to one gallon of water, then you have got your nutrient solution. Test your P.h. reading, as water from the town supply, also rain water, vary, often from day to day. The insoluble matter in the concentrate is phosphates, but is hardly visible when mixed in the nutrient solution.

If a large container is required for growing in large quantities, a small electric pump is useful, which can be timed by a clock to pump in the solution at the time required and the outlet regulated to allow the solution to run back into the tank at the speed required, lasting several hours, according to the working of the valve.

(Those members interested in soilless culture, I would advise writing to Kingbro Products, as advertised in this Issue, as I have seen a leaflet which gives even more information than can be obtained in an article, also a sheet of illustrations of methods.—Ed.)

It is always interesting to learn of experiences of the successful wintering of our plants in the open. Mr. H. N. Judd informs us that the following have survived the winter of 1949-50 outside, covered by a glass cloche, *Gasteria candicans, Sedum Treleasii, Opuntia vulgaris, Echeveria agavoides.* Advices of this kind are always welcome for insertion in the Journal.

Mr. R. A. Bridgwater, of 17 Worcester Road, Sutton, Surrey, has 100—150 collection of cacti, some duplicates, mostly five—ten years old for sale at a price of £20. Will members interested please write Mr. Bridgwater direct. In these days of restrictions it is not often we come across such an opportunity to add to our collections at such a reasonable cost.

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Contents

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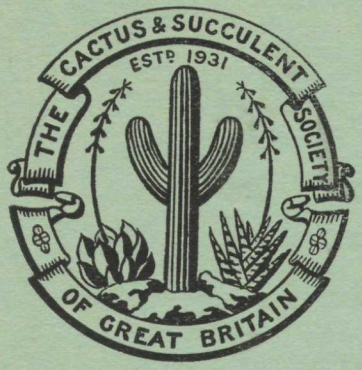

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SOCIETY NEWS

1950

Nov. 7th, 6 p.m. S. G. Fiedler : Plant Reminiscences.

Dec. 5th, 6 p.m. E. Shurly : Wintering Your Cacti.

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Vol. 12 *OCTOBER*, 1950 *No.* 4

EDITORIAL

In this issue of the Journal will be found an article by Professor Dr. F. Buxbaum. The article has been specially written so that even the beginner will be able to understand Professor Buxbaum's studies and theory. The subject is an extremely interesting one and makes an appeal to a much wider audience than reached by the circulation of the Journal, which, however, gets to most of the countries of the world. We feel very privileged to be the media chosen to communicate the ideas to the world. We feel that these ideas should receive the closest attention of all studying our plants here and overseas. We have not, personally, had the opportunity of testing the accuracy of all of his conclusions, but our intense study of *Mammillarias* does give more than colour to his ideas and it is interesting that the plants Professor Buxbaum has excluded from the real *Mammillarias* are just those which we have proved to confuse any arrangement of a key to the genus. The theory of parallel development of shapes, etc., is an ingenious one and we feel that the article is a very definite addition to our knowledge and a valuable contribution to what we know of our subject. We recommend a careful study to every reader, and others, interested in our plants.

We have heard much about frame culture of cacti and succulents. Many of us have passed it by as a fad, but our experiments in this field have converted us and provided reasons why frames are so suitable for the cultivation of cacti and succulents. In the January issue of the Journal there was an advertisement of P.C.T. frames, and the editor purchased two of them as the number of his plants was bulging the walls of his twenty-four foot long greenhouse. These two frames were installed on waist-high brick walls with ordinary soil inside and topped up with ten inches of coarse sand. His South African succulents, in pots, were plunged into this sand up to nearly the rim of the pots and he was able to instal nearly two hundred plants in the two frames, some of the pots being 4—6″ in diameter. In the greenhouse these plants did not make much progress, but after their transfer to the frames they leapt ahead and showed such progress that *Stapelias* were also transferred and ranged round the edges of the frames. They, too, showed such progress that, for the first time, they are freely offsetting and flowering. The editor is a complete convert to frame culture and it would appear that the fancier who only has room for a small frame in a backyard is in a very favourable position compared with his more fortunate friend with a large greenhouse. The frames permit all the air possible and all the sun to get at the plants and this is the reason for their progress. Also these P.C.T. frames are fitted with gadgets that enable the tops to be raised nearly eighteen inches and provide even more air and sun. They are ingeniously made and they can be recommended to all. It is reprehensible that the editorial should be used for advertising purposes, but the great value of the frames to cacti and succulent cultivators is a sufficient satisfactory reason for their inclusion.

Subscriptions are renewable on the 1st January, 1951. All members are requested to remit to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, the sum of 21/- for their renewals as early as convenient, but certainly not later than the 1st January, 1951. If you would be good enough to do this it will be very much appreciated as it saves a great amount of work and expense if renewals are paid up promptly.

CULTURAL NOTES

By A. BOARDER

In October it is necessary to gradually withhold water from the majority of Cacti and other succulents. The growing season is over, but there is still plenty to do in the greenhouse. As the month of October draws to a close, it will mean that the watering of the plants must be carried out very carefully. If a good watering is given to a number of plants at this time of the year, the weather may quickly change and if it turns very dull and cold, then the pots will not dry out as soon as they should do and you may have some difficulty in getting them dry before some frosts appear. It is a wise plan to give very little water when you are watering at this time of the year. If, for instance, you have been in the habit of giving enough water to just fill up the space at the top of the pot, then give half the amount at a time. It is better to give too little at a time than too much. If the pot dries out again fairly quickly, you can give a little more water, but not enough to make all the soil in the pot soggy wet. I do not believe in stopping all watering in the greenhouse too early in the autumn. I am sure that many of the plants will benefit from enough water occasionally to prevent them from shrivelling up. I usually continue to water carefully right up to the end of October unless we get a very sharp frost when all watering is withheld.

This month must see all your preparations for the winter well in hand. Whatever form of heating you are intending to use, see that it is ready for use by the end of this month. The first hard frosts may come as early as the last week in October but, if not, it is not often that we can get through the first week of November without sufficient frost to blacken the Dahlias. If you are using boiler heating, be sure that you have a supply of fuel ready. The varied types of paraffin heaters are very useful in a small greenhouse and I have never found that the smell or fumes do any harm to the plants. They, probably, have a good effect in that they check insect pests. Should you be using electric heaters, it is advisable to go over all the connections to make sure that everything is in good order. Sometimes a break occurs in one of the filaments in a tubular heater and, unless you are of the mechanically minded type, it is as well to let an expert do the repairs. I found a break in one of my filaments in a ten-foot heater this year and by joining up the wires again I was able to get it going again. If you are installing electric heating for the first time, then I am sure that it is advisable to see that you have sufficient power or strength in the heaters to keep out the severe frost without undue strain. Providing that you have a thermostat to control the heat, it does not matter very much what length of tubular heaters you use. You will not use any more electricity with forty feet of heaters, than if you only had ten feet. The thermostat will see that the electricity is cut off as soon as your correct temperature is reached, and it is better to have heaters working well within their capacity than to have small ones which are strained to the limit to keep up a reasonable warmth.

Very many growers ask me what temperature they should aim at to maintain in the greenhouse. For adult plants, I advise a minimum temperature of thirty-four degrees. This may seem low to many people, but I can assure you that no harm will come to any of the plants as long as the temperature does not go below this point, providing always that the pots are dry. I usually have about five degrees of frost in my greenhouse some time each winter, but have never found any ill effects from this. There is no need to coddle the plants during the winter. They are well able to withstand very cold weather and, in their native habitats, they have to put up with great extremes of heat and cold. It must be appreciated that these remarks apply only to adult plants and when your seedlings become adult plants must depend on the treatment which they have received and the size to which they have grown. For my part, I find that, once my seedlings are through their first winter, they may be treated as adult plants and they then get no special care other than to see they do not remain very dry for too long a period. In most greenhouses there is one spot, at least, where it keeps fairly warm, and you should see that the younger plants, and the more tender ones, are in this warm position. Most cacti show by their skin and the presence of hairs or spines, how much cold they are likely to stand and, therefore, by the time the winter appears you should have placed all the tender ones near your heating system and the hardier ones can be further away. If, on the other hand, you have a greenhouse which contains plants other than cacti or other succulents, then, perhaps, you are forced to keep the greenhouse at a higher temperature than that which I always recommend. You may then find that the cacti require different treatment to that which you would give if they were in a house to themselves. Many types do not like to be kept too warm in the winter unless they have a little water occasionally. You must use great care when watering in such a greenhouse and give as much air as possible on all suitable occasions. If such a house has plants which are watered now and again, then the atmosphere may be rather on the damp side for most of the time and under this condition, the cacti in the house may get all the moisture they require without any additional watering.

The treatment of this year's seedlings is a different problem. If you are able to make a form of frame in which to place the seedlings, you will then be able to give them a little extra warmth by using only a little electricity. A small frame is easily kept at sixty or seventy degrees and a separate thermostat in the frame will mean that very little cost is incurred for fuel. See that the seedlings have some air all the time. A very close moist atmosphere encourages damping off disease. With a temperature of the above, it will be necessary to water now and then. The water should be about the same temperature as the frame so that the seedlings do not get a chill. Do not leave any water on top of the plants as this can soon cause trouble. Do not, on any account, transplant any seedlings as late in the year as this. Any which are crowded will be better left where they are until the spring. By the end of October you should have examined all your plants to see that there are no pests, such as mealy bug, scale or red spider, on them. If any are found, they can be destroyed by the application of methylated spirit to which has been added one part of nicotine to each forty parts of methylated. Whilst examining all the plants, take the opportunity of hoeing the top soil on all the pots. If any moss has grown thereon, remove this and, if necessary, top up the pot with some fresh potting soil. Arrange the pots so that they do not touch one another, as a small space around each pot does help to ensure a circuit of air apart from the fact that pests have a little more difficulty in moving from plant to plant. Should there be a leak from the roof of the greenhouse, see that no plant stands where it will get continual drops of water as this can cause a rot to set in. If you find a plant which appears to remain wet long after it has been watered, it may be as well if you turn the plant out in case something has gone wrong with the drainage. I would not advise re-potting any plant in good condition at this time of the year, but, if the soil is not sweet, then I am sure that it will be much safer to change the soil now than to wait until the spring. After you have re-potted such a plant, there will be no need to water it at all until the general watering starts the following year.

If you require any seeds from your plants, it is well to take the pods off now if you have not already done so. Once the pods on *Mammillarias* have dried or burst, they are ready to gather. Do not be afraid to leave these kinds to ripen well as the pods do not burst and spread the seed as *Euphorbias* do. Place all pods in separate packets for each plant and label them at the moment. During the winter evenings you will find plenty of time to clean the seeds from the pods.

Plants, which have been placed out of doors for the summer, should now be brought inside. Clean the pots well and see that the drainage hole is free from soil. If it is intended to keep the plants in a spare or cold room in the house, then it will not be necessary to give any water all the winter. If there are any *Opuntias* among the plants, it may be advisable to give them a slight watering now and again to stop them from withering too much. Any *Stapelias* should be kept in a dry, airy position as, otherwise, they may develop those nasty black growths to which they are subject. I often find that the old stems of *Stapelias* are more prone to disease than the new growth. If *Stapelias* are broken up and re-rooted each year, you find that they not only flower better, but they will, probably, go through the winter in better condition. A young plant of *S. gigantea* flowered for me recently and the flower was nine inches across, a very handsome flower. Many growers would be astonished at the many and varied types of flowers which some of the *Stapelias* bear.

Where you have plants on shelves, it is always beneficial to place some gravel under them to prevent the drainage hole from becoming completely blocked up. Also under such conditions you will find that, if you have one shelf above another, it will be better to make some trays of zinc, or similar substance, so that when the plant is watered the surplus does not drop down on to the plant beneath.

My seedlings, which were sown in February this year, were transplanted into a good mixture, in June, into concrete troughs which had no drainage holes in them. Many have made such good growth that, by August, some of them were nearly an inch across and, as they were touching one another, I had to pot some up into two-inch pots. These seedlings would not have grown as large as this if they had not been transplanted. Most of these plants are *Mammillarias*,

See to all the labels on the plants and, if any have become worn, replace them while you can still see the name. During the winter, you will find plenty of time to make a list of all your plants. The numbering of each plant will be of great use to you and then a book can give all the particulars for each number.

Dr. A. L. Geyer, the recently appointed High Commissioner in London for South Africa, is a well-known collector and is an authority on our subject and has had several plants named in his honour. He is honouring our Society by giving us a lecture in March, 1951, and details will be announced in due course.

POLYPHLETIC ORIGIN OF THE GENUS MAMMILLARIA

By Professor Dr. habil. FRANZ BUXBAUM

(Based on researches into the general morphology of the Cactaceae, I elaborated the phylogenetical system of the *Euechinocactanae* F. Buxb., (including the North American *Echinocactanae* and the *Coryphanthanae*), to be published by the Osterreichische Botanische Zeitschrift, 1950).

The difficulty of a phylogenetical (evolutionary) system of Cactaceae is caused by two factors ; insufficient description of most of them and the abundant occurrence of convergences, simulating a near relationship of genera which have only reached the same degree of evolution and thus have a similar shape.

In the Cactaceae, especially the *Cereoideae*, the morphological typus is very uniform as there are only few rows of progression, which occur again and again in most of the lines of evolution, thus finally forming very similar shapes of body, flower and fruit in very different genera. Only the knowledge of the possible progressions of all characteristics can prevent the same degree of evolution becoming confused with true relationship.

To discover the progressions of all plant parts, I examined the general morphology of the whole of the Cactaceae. The results are in my " Morphological Monograph of the Cactaceae," now being printed by the Cactus and Succulent Society of America.

These researches show that most characteristics are very variable, often within one genus, as they correspond to ecological (environment) factors in the habitat of the plant. Only a few are slow in progression thus remaining constant for a greater part of the Family within every line of evolution. As these constant characteristics also follow only progressions typical of every line of evolution and cannot change abruptly into another morphological type, they are best for phylogenetical researches.

In my book " Grundlagen und Methoden einer Erneuerung der Systematik der Hoheren Pflanzen," Vienna, 1950 (Foundations and Methods of a renewal of the Systematics of Anthophytes), I have analysed the systematic value of the different morphological characteristics. I show there that the value of any charactertistic depends on the point of time at which it originates. That is to say, those which evolve at a very late moment of development mostly cause only specific differences, while those which originate in the early part of development of the concerned organ, mostly are constant for a greater group of species and, therefore, can be used for recognition of phylogenetical connections.

The shape of the seed and the development of the embryo and perisperm (albumen) are predestinated very early. Therefore, the characteristics of the seed, which originate from the ovule, must be of great systematic value as the most relatively constant, such as the testa (skin) structure, the hilum (attachment to stalk scab), the microphylar pore (hole in skin through which water enters and swells the embryo) and the perisperm. Also these must be used to gain knowledge of possible progressions. For example, the primitive genera of any line of evolution generally have quite a large perisperm, while those more highly developed frequently lose it, such as *Echinomastus* with, *Thelocactus* without perisperm ; *Escobaria* with, *Neobesseya* without perisperm. The ancestors of the Cactaceae (the Phytolaccaceae), and also the primitive Cactaceae themselves, have a black testa, but we often observe that within any line of evolution the higher genera (or even species) gradually lose the black pigment (*Notocactus*, *Parodia*, different species of *Gymnocalycium*, the *Rhipsalides* and so on). A line of evolution, which has lost the black pigment of the testa can never again develop genera with a black one. This is a law of evolution !

In prosecuting my morphological researches, I was able to develop also the phylogeny of the *Euechinocactanae* F. Buxb., the Tribe which contains the North American *Echinocactanae* (exclusive of the genus *Astrophytum*, which does not belong there !) and the former *Coryphanthanae*. In these researches I found that the *Coryphantha* shape, as well as the *Mammillaria* shape, was not the result of a common origin, but of an equal degree of evolution.

Originating from a Primordial Stage (I), which only contains the genera *Echinocactus* and *Homalocephala*, we can distinguish three branches of evolution, each connected with the Primordial Line, *Echinocacti*, by a Connecting Stage (II). Every one of these branches reaches the Middle or *Coryphantha* Stage (IV), which is characterised by more or less furrowed tubercles and, finally, the *Mammillaria* Stage (V) with axillar position and maximal simplification of the flower. The first and second of the three branches (Ramis I and II) also pass a Transitory Stage (III) of *Echinocactus* Shape, which means a more or less ribbed body which flowers from the upper margin of the areoles.

The first branch (Ramis I) of this phylogenetic tree is characterised by verrucose (warty) testa. Only with the seeds of the primitive *Hamatocactus uncinatus* (former *Ferocactus* or *Glandulicactus*), the outer walls of the testa are rather flat and in the very highly developed *Mammilloydia* (former *Mammillaria*) *Ortiz rubiona* they are re-flattened. But there they are rounded in the typical manner. Between these cells are small spots which Craig calls " pitted in rows," but this is very different to the pits of other seeds. I call this typus of the testa " spotted."

(It also occurs in different other lines of Cactaceae in the progression of verrucose testa).

The Connecting Stage of this branch is represented by the genus *Sclerocactus*, which has wool in the axils of the scales of the flower tube. In its further evolution, this branch is forked into two lines, *Strombocacti* and *Thelocacti* which both reach the *Mammillaria* Stage. *Thelocacti* forms two branches, the chief of which leads (in Stage IV) to the genus *Neolloydia* and from *Neolloydia* to some former *Mammillarias* which also have a black, verrucose testa and, as *Neolloydia*, no perisperm. The seed of *M. candida* is hardly distinguishable from those of *Neolloydia Beguinii* or any other *Neolloydia*. This species represents the direct progression from *Neolloydia* in habit and the relatively dry fruit. Therefore, it was necessary to separate them from *Mammillaria* and establish a new genus *Mammilloydia* F. Buxb., which contains the former *M. candida*, *Ortiz rubiona* and, according to the habit and description of the seed, *M. lenta* and *Herrerae*.

Maybe also the second branch of the *Thelocacti* which contains *Ancistrocactus* (Stage III), *Hamatocactus* and *Cumarinia* (pro genere, the former *Coryphantha odorata*) in Stage IV, reaches Stage V. I am not yet able to analyse the rare *Mammillarias* of the *Beneckei-Nelsonii-balsasensis* Group. They certainly cannot be connected to *Mammilloydia*, but they have very large, verrucose seeds and, therefore, belong to this branch of evolution. Their hooked central spines seem to connect them with the *Hamatocactus* of the *Thelocacti*. In this case it would be necessary to give them generic character, too.

The second branch of evolution (Ramis II) is connected directly to *Echinocactus* by the genus *Ferocactus*. Although this genus had lost the areoles in the axils of the flower's scales, it is connected by all characteristic habits. The testa cells have thickened radial cell walls, forming a latticelike or a distinctly pitted structure. The Transitory Stage III is realised only in the more primitive branch Linea *Ferocacti*, while another branch (Linea *Neobesseyae*) develops in the Medial (IV) and *Mammillaria* Stage (V). In Stage IV, only *Escobaria* and its *Mammillaria* Stage has a perisperm in the seed (perhaps also *Mamillopsis* ?) thus connecting the central genus *Neobesseya* with *Ferocactus*.

But *Escobaria* must be enlarged by those former *Coryphanthas* which have pitted, mostly black seeds. These form the new subgenus *Pseudo-coryphantha* F. Buxb., containing *E. chlorantha* (Engelm) F. Buxb., *E. vivipara* (Nutt.) F. Buxb., *E. neomexicana* (Engelm) F. Buxb., *E. arizonica* (Engelm) F. Buxb., *E. deserti* (Engelm) F. Buxb., *E. aggregata* (Engelm.) F. Buxb., and *E. oklahomensis* (Lahm.) F. Buxb.

The more primitive *Escobaria* subgenus *Pseudocoryphantha* continues in the genus *Neobesseya*. On the other hand, subgen. *Euescobaria*, which is more highly evolved as they become more dwarfed than the *Pseudocoryphantha* and have a more simplfied (smaller) flower, proceeds to the *Mammillaria* Stage (V).

E. Sneedii nearly has the habit of *M. elongata*, while *M. leona* (*Pottsii* in Br. & R.) compares with an *Escobaria*. This species is the connecting link between *Escobaria* and its *Mammillaria* Stage ; the *Leptocladodae*. These *Mammillarias* always have been recognised as an isolated group. Although their seeds have a perisperm like the true *Mammillarias* and, therefore, cannot be descendants of *Neobesseya*, the seeds are pitted and, therefore, these plants belong to Ramis II, *Neobesseyae*, but they are direct descendants of *Escobaria*. Therefore, *M. leona*, *microheliopsis*, *echinaria*, *microhelia*, *elongata* and *viperina* do not belong to the true *Mammillarias* nor to the new genus *Ebnerella* (without perisperm). It was necessary to separate and give them generic character as the new genus *Leptocladia* F. Buxb.

Neobesseya, with its rounded black, pitted seeds and its distinct aril, has lost its perisperm and is higher developed than *Escobaria*, to which it is not connected by *Euescobaria*, but by the subgen. *Pseudocoryphantha*. It is a really central genus, as there the tree of evolution forks into three branches. Only one of these retains the aril, developing it to a large corky adjunct ; the genus *Phellosperma*. To this genus also belong the long flowered *Mammillarias*, which Backeberg has put into his genus *Krainzia* (*M. Guelzowiana*, *longiflora*) and also the former *M. pennispinosa* Krainz. *Krainzias* still have a small aril and a large flower and, therefore, we must take them for the most primitive species of the genus *Phellosperma*, while *M. pennispinosa* has the best developed aril and the most reduced (simplified) flower.

Another direct descendant of the genus *Neobesseya* is the genus *Dolichothele*, with large, yellow flowers, without flower tube, but a solid column above the ovary, like an *Aylostera*. In habit, this genus very much resembles *Neobesseya Wissmannii*. The seed has lost the aril.

The genus *Dolichothele* continues in the *camptotricha* Group of the former *Mammillarias*. Tiegel established their near relationship and, therefore, he included them in *Dolichothele*, but Craig did not agree with this expansion because " they do not possess the other characters of the genus." The characteristic column of the *Dolichothele* flower is absent, and the flowers are much more simplified, having the shape of a *Mammillaria* flower. Also the habit is more developed than the true *Dolichothele* connected with these by *M. decipiens* which approaches in habit and spine arrangement to *Dolichothele* more than the other two species, *M. albescens* and *camptotricha*.

As the seeds of these species are pitted and perisperm-less, they do not belong to the true *Mammillarias* and do not originate directly from *Neobesseya* as does the new genus *Ebnerella*. They are the final evolution of a lateral line of Ramis II. It is not possible to leave them in the genus *Mammillaria* or to connect them to *Ebnerella*, but to create a separate new genus, *Pseudomammillaria* F. Buxb.

The aril is lost in the third branch which originates from *Neobesseya* and reaches the *Mammillaria* Stage. This branch of evolution begins with *Mammillarias* that have black, pitted seeds, included in the new genus *Ebnerella* F. Buxb. The most primitive of this genus (Subgen. *Archiebnerella* F. Buxb.) have large flowers with acute perianth segments and big seeds and only differ from *Neobesseya* in that they have no aril ; *E. zephyranthoides*, *E. aureilanata*, *E. Wilcoxii* and *E. microcarpa*. *E. zephyranthoides* must be taken as the primordial species of the new genus and the connecting link with *Neobesseya*. Its seedlings are much larger than those of any other *Mammillaria* and the plant itself shows all tendencies which later become realised in the higher developed *Ebnerella*. To this genus firstly belong all species of the former *Mammillaria* with black seeds, except those with verrucose testa. Relative to the seed, we can observe the progression from the shortly globular shape to the elongated, and, finally, constricted above the basal hilum on the one hand, and a progressive emphitrop (micropyle of ovule at right angles to stalk) bending with displacement of the hilum into a subbasal position on the other (*E. erythrosperma*, *bombycina* and others). The testa pits of the more primitive species are small but distinct in an otherwise smooth testa and become relatively large in further evolution, finally forming deep and large pits between a net-like structure of the radial cell walls. The black pigment of the testa is rather constant in the genus, nevertheless, it finally also turns into more or less dark brown in a few groups of species, which, nevertheless, can be distinguished from true *Mammillarias* by the absent perisperm. In the flowers, the progression proceeds from the large flowers with acute perianth segments to small ones (simplified) with, finally, oblanceolate perianth. With regard to central spines, some have several hooked, others have largely or completely lost the hook and, finally, complete loss of all central spines. The reduction of the hook can be observed sometimes within one species (*E. occidentalis*, *mazatlanensis*) and total loss sometimes occurs in the same species (*E. Swinglei*). In the subgen. *Archiebnerella*, one species (*E. aureilanata*) has entirely lost the central spines.

From the elongated species, especially the western types, is evolved the genus *Cochemiea* with zygomorphic flowers. From the hooked species develops the genus *Bartschella*, the fruit of which has lost the fleshy character and becomes a capsule like those of *Rebutia*. Probably also the genera *Porfiria* and *Solisia* are developments of *Ebnerella*.

The third branch, which directly originates from the Primordial Stage (I), Ramis III, only contains the amended genera *Coryphantha* and *Mammillaria*. The Connecting Stage is represented by the series *Macromerae* of *Coryphantha*. Although these differ very much in habit from *Echinocactus*, it is not possible to connect them with any other genus as they still have tufts of wool in the axils of the scales of the flower tube. This is a very primordial character as well as the rather short furrow in the tubercles. Also the large shape of these species is primitive, as the general progression of the Cactaceae shows a tendency to diminution, especially in the *Euechinocactanae*. The seeds of *Coryphanthas*, particularly *C. Poselgeriana* and *robustispina*, are very primitive. They have a large, much bent and less succulent embryo, nearly surrounding the large perisperm. Other *Coryphanthas*, so far as I am able to examine them, have a more succulent and, therefore, less bent embryo and a smaller perisperm. This progression is continued in the genus *Mammillaria* s. strict. Another characteristic of this branch of evolution is the relatively tender brown testa without pits or warts. The funicule is joined to the ovule laterally. Therefore, the *small* hilum is also lateral. The micropylar pore in *Coryphantha* is more or less distinct, but never is it close to the hilum.

The amended genus *Coryphantha* only contains *Macromeres*, as the primordial series, and the two divergent series *Sulcolanatae* and *Glanduligerae*. While *Glanduligerae* do not develop to the *Mammillaria* Stage, *Sulcolanatae* are the origin of the true *Mammillarias*.

In the amended genus *Mammillaria* seeds can be traced directly from those of *Coryphantha* in a straight progression. In the more primitive species of *Mammillaria* the testa is smooth. On further development of the genus, embryo and perisperm do not grow so much as the testa layers and, therefore, the testa becomes rugose (wrinkled) in the dry mature seed. In the progressive evolution the radial cell walls of the testa cells become folded in a zig zag line.

It is not possible to refer to all the facts and results of my comprehensive researches in detail. The original work consists of 48 pages, but, I believe, this report shows that it is necessary to divide the genus *Mammillaria*. Therefore, Craig was right when he wrote in his famous "*Mammillaria* Handbook" that the characteristics of the seed would be the best principle on which to base the order of the genus and Hester was also right by demonstrating that each genus of the Cactaceae has its own distinctive seed shape !

ALLOTHROMBIUM FULIGINOSUM

By EDWARD ELKAN

A friend at last ! I hardly believed my eyes and ears when I first met the creature with the awe inspiring name. Yet it is true ; in the face of the overpowering host of mealy bugs, scale, red spider and many other pests that are intent on ruining our collections, nature has provided an animal that will fight on our side. Its statue should be found in every hothouse !

My acquaintance with this useful creature dates from a visit to the collection of our respected librarian, where I saw something crawl about among his flower pots that looked like a red spider a hundred times magnified. " What is this ? " I exclaimed, " I cannot remember having seen this thing before. You haven't a special pest in your greenhouse, have you ? " " No," said my host, " I do not know what this is myself. I have these creatures in the hothouse every year. They do not seem to do any harm and there is even a rumour that they have been seen eating mealy bugs ! " And, sure enough, much as I looked around me among his considerable collection of cacti and succulents of all sizes, there was not a mealy bug to be seen and that, in my experience, is a rare state of affairs, even with a careful collector.

I came home, therefore, with one of these precious things in a box, determined to get to the bottom of the matter, and this I have done with the aid of the zoology department of the British Museum of Natural History who, as always, have been most kind in helping me to find out the facts about this peculiar creature.

One cannot really describe Allothrombium better than as a red spider grossly magnified. Its surface is of a velvety red, its size 2.8—3.6 mm. in length and 1.5—2.2 mm. in width. It is, therefore, easy to see and in the order of magnitude of ordinary spiders. It has four pairs of legs and a complicated set of mouth appendages which serve him for feeding. Among these, a sharply pointed sucker is the most important accessory. It belongs to the mites, lives in the earth and among rubble (hence the German name " Erdmilbe "), and has been exhaustively studied and described by French, Russian and German authors.

These authors were not, for a long time, unanimous on the feeding habits of Allothrombium and, yet, it is these habits that are of such great interest to cactophiles. One author said he has seen an Allothrombium suck up the juice of a ripe and damaged plum ; another reported he had bred them in a glass dish and definitely seen the animals attack each other. Another again held that, in their youth, these creatures certainly lived on aphis and other small insects, but that they became vegetarian when adult. Finally, it was established beyond doubt that these useful mites are " carnivorous " all their life and, apart from their own kin, which they do not attack when other prey is available, the following have been observed to serve as their prey ; apple blossom weevil, ants (Lasius bicornis), large tortoiseshell butterfly (Vanessa polychloros), field cricket, shield bug (Aelia), shield bug (Pentatoma rufipes), pear lace bug, onion thrips, another kind of thrip (Frankliniella intonsa), ivy aphid, dragon fly (Tetraneura ulmi), another aphid (Pterochloroides persica), and yet another aphid (Phyllaphis fagi), coccids (mealy bugs). It seems that the velvet mite attacks its prey with its stiletto and sucks them dry. Rumour has it that it attacks their eggs, too.

The young females of the velvet mite hibernate in the ground and appear towards the end of April. From then until the end of May, they deposit their eggs, 200—400 at a time, in a little nest built 2—10 cm. below ground, the entrance to which is stopped up by the female after the eggs have been laid. They are orange in colour and they hatch within three or four weeks. The larvae, which appear from these eggs, are by no means identical yet with the adult mite, but they too are carnivorous from the moment they are born and they can attack insects far bigger than themselves. They are not, at the beginning, as red as the adult mites and are, therefore, difficult to see. There can be no mistake about the grown up velvet mite, however, once it has made its appearance. The larvae develop into nymphs of several stages, gradually becoming more and more like the adult mite. Eventually, the mature adults emerge and the circle starts afresh.

It does not seem as if the velvet mite were a particularly rare guest in this country. Experts relate that they have found many of them here and on the Continent. I only wish it was not so rare in my own hothouse, but, perhaps, the climate is too dry there or, otherwise, not congenial. But there may be cactophiles who have seen this mite and who may have taken a poor view of it, being ignorant of its stalwart and most beneficial propensities. Hence this " apologia " for Allothrombium fuliginosum and " good hunting " to it.

The Chairman, Mr. A. J. Edwards, put up an interesting contribution to the Merstham Horticultural Show with a display of 53 named varieties of cactus.

WINTER WATERING AND BLOSSOM

By S. NAYLOR

" Do they flower ? " is the most frequent query asked in respect to cacti. We all have the desire to complete the life cycle of our plants, as well as to enjoy the beauty of form and colour presented in a flower. This desire is not gratified in the case of the majority, also some of us are easily pleased if we get just a few flowers.

Can we get more and so make cactus culture more popular ? Are we giving our plants the right treatment ? Have we, in the past, wrongly advised a safety-first treatment because of our fickle climatic conditions, saying " You must keep them dry or the frost will get them ? "

Under their natural conditions, most cacti have to endure severe cold almost every night. Ask those who have been there collecting, a fire and blankets are necessary for comfort and a night's sleep. Frost occurs only where moisture is present. The moisture contained in a cactus, however, is mixed with all the other substances which go to make up the living plant. Additionally, it is enclosed in the tough epidermis, or skin. These conditions are a partial protection and account for the ability to endure several degrees of frost without damage. Frost, in itself, does no harm, thawed out very slowly no hurt would occur, but in our weather conditions temperature changes are often sudden and the plant structure is damaged beyond repair. It seems to me that exposure to low temperatures is a necessary part of their culture to ripen and induce the production of flowers. This, one thinks, applies to the majority of species, but must be accompanied by another condition already hinted at.

Our usual advice, and common practice, has been—keep without water during the winter. It is admitted this procedure is safe, but such drastic treatment shrivels the bodies and dries up the roots under our pot conditions, also causes a slow start of activity in spring, because new roots have to be produced.

My practice, for several years now, has been to water on bright dry days during winter, just sufficient to avoid drying out, but not enough to encourage growth. Growth will not occur unless heat is present, except for enough to combat frost. Consistent with this, is the provision of all the fresh air possible, winter and summer. There are many days during our variable winter when this can be done, it will harden and invigorate.

This brings me to speak of results. I am satisfied that this treatment will give others what was in my greenhouse on the 14th May last. Flowers on a dozen different species and buds formed in others, making in all thirty kinds, in the main cacti, showing colour. Since then to date, there have been four more showing buds. Not only are the flowers appearing earlier, there is also more of them and far less of that disappointment caused by the drying and dropping of promising buds.

My house is quite a small one, 7 ft. 6 ins. by 5 ft. 6 ins., and heated by two one-inch wick lamps, one on each side, which is another reason for constant ventilation.

To make this article complete, the genera of flowered plants must be given as many only bloom well under this treatment, while some need heat under the old treatment ; *Adromischus*, *Aporocactus*, *Bergeranthus*, *Chamaecereus*, *Cephalophyllum*, *Selenicereus*, *Dolichothele*, *Gymnocalycium*, *Glottiphyllum*, *Mammillaria*, *Rebutia*, *Echinopsis*, *Epiphyllum*, *Echeveria*, *Notocactus*.

It is worth pointing out that all the above mentioned plants were re-potted with fresh soil during the early spring. This proves that re-potting does not prevent flower formation, as some growers suggest.

Further evidence in support of the foregoing was evident when visiting friends and fellow growers, several who use the dry method treatment, had only a few buds between them, while at my house there were a dozen kinds in bloom. A grower to the trade lost the use of his boiler and could not get it repaired and was without heat all the winter except for a few oil lamps during the night. With the astonishing result, to him, that everything grew well and looked better than ever before. He also had far more flowers.

These few remarks are submitted in the hope that many who coddle their plants will be encouraged to grow them hard and get flowers.

Berks and Bucks Branch ; in addition to normal branch activities, several members exhibited plants at various shows. Mrs. Stillwell, at the Clewer and Dodworth Gardening, Arts and Crafts Exhibition and raffled a miniature garden, resulting in a considerable contribution to the centre funds. Miss Jensen and Mrs. Wells at the Taplow Horticultural Show. The branch is planning, for September 27th, a table show for members at the Conservative Club, Windsor.

NEW PLANT DESCRIPTIONS

By CURT BACKEBERG

Thelocactus Schwarzii sp. n.

Simplex, ad 6 cm. altus, glaucinus ; ca 5.5 cm. latus; costis paene omnino tuberculatis (!), 13, tuberculis ad 13 mm. longis, 9 mm. latis ; areolis oblongis, ca 2 mm. longis, albidis ; aculeis centralibus O (!), radialibus 13—14, lateraliter radiantibus, vel flavidis vel primum basi rubicundis deinde omnino flavidis, 3 superioribus aliquid applanatis, 2 ad 17 mm. longis, supremo ad 27 mm. longo, incurvato ; floribus ad 8.5 cm. latis, roseo-purpurascentibus, fauce coccinea ; tubo viridi ; squamis acutis ; antheris flavidis, stylo albo, stigmatibus roseo-coccineis.

Simple, more or less 6 cm. high and ca 5.5 cm. in diameter ; a little bluish green ; 13 ribs, nearly entirely tuberculate, tubercles to 13 mm. long and 9 mm. broad ; areoles oblong, ca 2 mm. long, very short whitish felt; no central spines, radial spines 13—14, horizontally spreading, a little recurved to the body of the plant, yellowish, or at first with red base, later quite yellowish, the 3 upper spines more or less a little flattened, two of them to 17 mm. long, the uppermost to 27 mm. long, more flattened and curved at the apex ; flowers to 8.5 cm. broad, reddish purplish with scarlet throat ; green tube with acute scales ; anthers yellowish, style white, stigma lobes reddish scarlet. Mexico, Tamaulipas, on plains, under bushes in heavy clay soil.

The inner perianth segments show a white zone above the scarlet throat.

This plant differs from *Thelocactus bicolor* and its variations in that it has no central spines, more ribs (13 instead of 8) and the ribs consisting of perfect tubercles. There is a dark green v. *texensis* of *T. bicolor*, not described hitherto, which also has a flattened upper radial spine, but ribs are less tubercled, eight ribs only as in the type, and one central spine.

The above described plant is also less conic and represents a well characterised species, the radials more appressed as in other forms. The plant was found by F. Schwarz and sent under No. 9.

Echinofossulocactus caespitosus sp. n.

Parvus (?), costis ca. 27, undulatis ; aculeis majoribus 3, ± applanatis (longitudine ± aequa), ca 21 mm. longis, flavidis, supero ca. 2 mm. lato, lateralibus ca. 1 mm. latis ; aculeis minoribus 4, albidis, tenuibus, ca. 5—6 mm. longis ; areolibus albido-tomentosis ; floribus ca. 11 mm. longis, albis, parte media viridula in phyllis perigonii interioribus, fauce viridula ; et antheris et stigmatibus (10) viridulis. Mexico (State ?).

The name was given by Schmoll, from whom the plants were received. The plants are presumably later cespitose ; my plants are rather small, but free flowering (plants of less than 5 cm. in diameter, 5—6 flowers very early) ; ca. 27 ribs, undulated ; 3 head spines, more or less flattened and of nearly the same length, ca. 21 mm. long, yellowish, the uppermost a little more flattened (2 mm.), the two side spines ca. 1 mm. broad ; secondary spines 4, whitish, thin, ca. 5—6 mm. long ; whitish felted areoles ; flowers about 11 mm. long, white, inner perianth segments with a greenish mid-stripe, throat greenish ; anthers and 10 stigma lobes greenish.

This is the first *Echinofossulocactus* I have seen with nearly greenish white flowers. Unfortunately, Schmoll has given no habitat, but by its spines and flowers, the plant is easily to be distinguished from others.

Mammillaria subtilis sp. n.

Simplex, nana ; axillis saetis crispatulis ; mamillis succo aquoso, ca. 3 mm. longis, conoideis ; aculeis radialibus albis, ca. 30, crispatis, capillaceis, centralibus ca. 6—7, albis, basi flavidis, 1—2 vertice fuscato vel rubido, ca. 10—12 mm. longis, tenuibus ; floribus infundibuliformibus, albis, ca. 10 mm. longis ; fructu ignoto. Mexico, San Luis Potosi.

Simple, dwarfish ; watery sap ; axils with curled bristles ; tubercles ca. 3 mm. long, conic ; white radial spines, ca. 30. curled, hairlike ; ca. 6—7 central spines, white, yellowish at base, 1—2 at the top zone brownish or reddish, ca. 10—12 mm. long, nearly bristly ; flowers funnel form, white, ca. 10 mm. long ; fruit unknown. Mexico, in the state of San Luis Potosi, about 80 metres north of the capital, in crevices, in half-shade, in good leafy alluvial soil. Received from F. Schwarz under the No. 70.

The plant was found by Mr. F. Schwarz. It is near *M. multiceps*, from which it differs in that *M. multiceps* has not been reported hitherto from S.L.P., it is more proliferous than *M. subtilis* which has longer and finer centrals, bristly, some of the centrals are hairlike ; centrals are not stiffly spread as in *M. multiceps*, but erect at the apex and often closing above it, which is never seen in *M. multiceps*, not so freely flowering, flowers are pure white, in *M. multiceps* they are creamish to yellowish salmon ; to the touch spines are like a brush, in *M. multiceps* they are prickly.

STEMLESS MESEMBRYANTHEMUMS—*continued*

By G. G. GREEN

The most popular of all Stemless *Mesembryanthemums*, the *Lithops* certainly prove very fascinating, and I always await this season of the year with a keen anticipation of the lovely show of flowers that never fails to please.

If watering has been carried out properly, the leaves should now be fully developed and firm, showing the beautiful markings and colours, and mature plants should be bearing their flowers or showing promise of doing so. Since July the plants should have received regular waterings from the bottom by soaking the pots, or if planted in the "garden," by the method described previously, using sunken pots as vehicles for the water.

It is always wise, as in the case of Cacti, to choose a bright day for this purpose and to wait until the soil is *nearly* dried out before repeating the process. Aim to keep the soil in a "growing" condition so that the root tips do not dry right out and die before the next watering is given. Such a check would not help the plants at all, and might do considerable damage, retarding the growth and hindering the proper development of the new leaves.

Under perfect cultivation, the old outer leaves should gradually shrivel as the new ones appear, to dry up completely as these latter become fully developed, but one should not be unduly worried if this is not the case, and instead of drying up the older leaves persist in growing. This is just a case of robust growth without the plant having had a complete resting period beforehand and too much water during the growing period. Sooner or later, given correct treatment the plant will adjust itself and normal growth take place.

Flowers are produced more readily if a good resting period has been observed, though the age of the plant must be taken into consideration as seedlings will not flower under two years of age, and not until three years sometimes. It is true that under unnatural conditions of forcing, etc., seedlings can be induced to flower when very young, but this achievement, if it can be so called, is not to be encouraged.

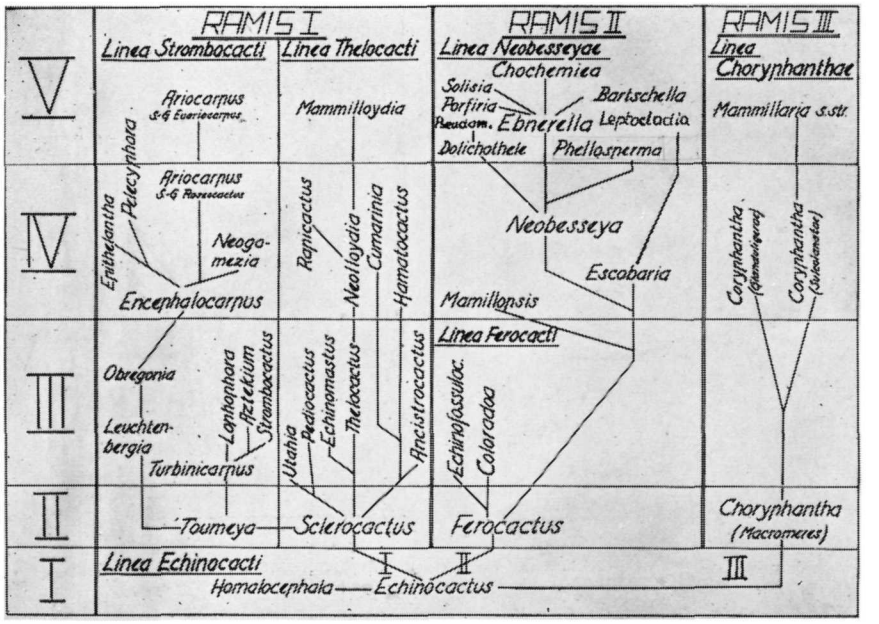
I have never yet been able to understand the urge some collectors have for flowering their seedlings at a very early stage, whether Cacti or Succulents, for in nature, this only happens after some unusually propitious season and, of course, only to those seedlings that have managed to survive germination under *normal* conditions. Two years of age can generally be taken as the time when one can hope for flowers from seedlings.

The temperature and general condition of the house during the winter and autumn has a great deal to do with the production of flowers. *Lithops* and most others of the stemless *Mesembryanthemums* are slow of flowering if the winter months have been spent in cold, clammy conditions, or if the autumn is also cold or wet, and if there is no artificial heat to help dissipate the chilly air. It should always be remembered that these plants love the sun, as much as they can get, too, and only suffer our winter because they have no other choice. It is up to us then, to try and help a little during the colder months by giving whatever aid we can in the way of warmth and brightness, if we are to grow them successfully. Very little aid is needed and it is surprising how much they respond to the minimum of care, so long as it is given.

When planted in the "garden" with the other species, as I have described, *Lithops* should grow properly and flower freely each year. The resting period, during our winter, should be rigidly observed and no water given them if they are planted or sunk in pots, until after the growing period has started in April. If the plants are to remain in pots on the usual staging, that is not sunk at all, a slight moistening of the base of the pots at fairly long intervals will prevent the roots drying completely and dying. It should be remembered, as I have just stated, that too much water will upset the natural progression and may cause flower buds to die in their embryonic stage, causing rot, or they may turn into leaves instead.

Lithops develop long tap roots, necessitating deep pots, especially if they are not sunk in the "garden," and care should always be taken when moving them not to break off any root tips that protrude through the drainage hole. When they do appear, the plants need re-potting, though generally it is not necessary, if a good soil mixture has been used to repot *Lithops* every year as they should be comfortable for at least two seasons in a deep narrow pot, or when planted in pans. Equal parts of good loam, coarse sand and leafmould with about a quarter-part of broken limestone or crushed bricks, is a good compost. Crushed oyster shells, old mortar or fine gravel will do in lieu of the limestone.

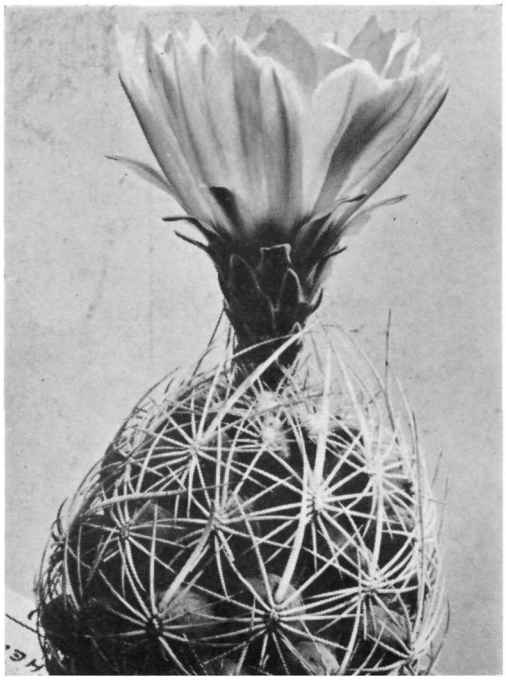
The bodies of the plants should not be set too deeply in the soil, being propped up with coarse sand or gravel, as a lengthy period of dampness round the "neck" may cause them to rot off.



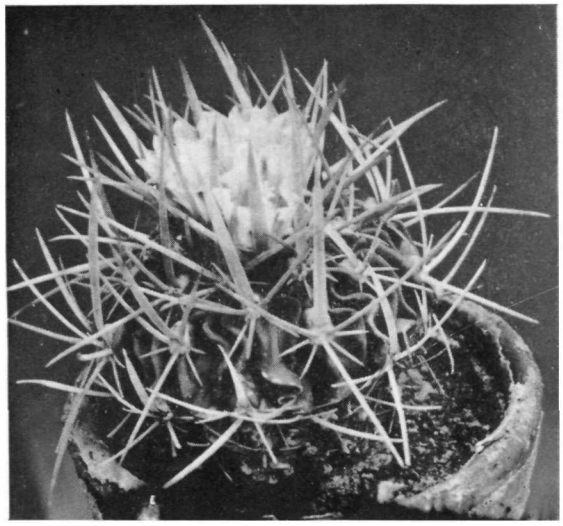
Euechinocactanae development — Prof. Dr. F. Buxbaum

Allothrombium fuliginosum (nat. size) — Dr. E. Elkan

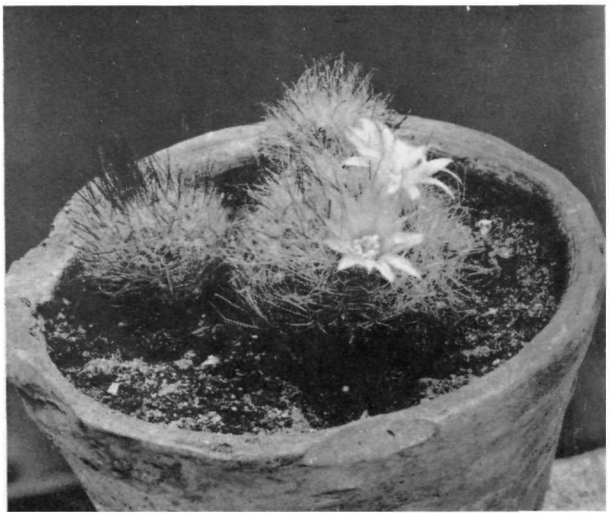
Mammillaria pygmaea — B. Alfieri Ltd.



Thelocactus Schwarzii sp. n. C. Backeberg



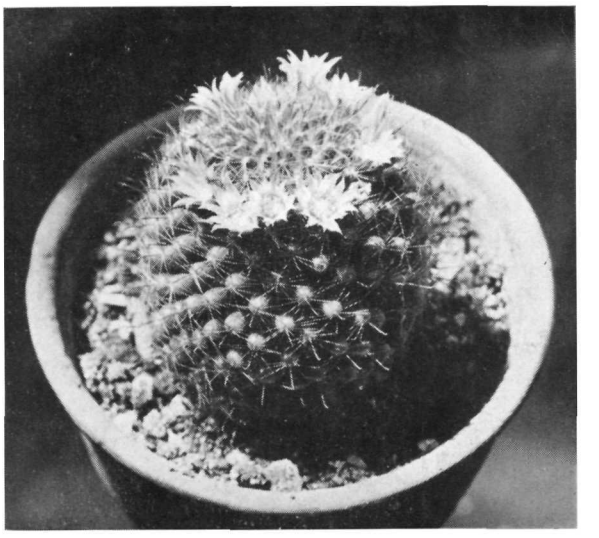
Echinofossulocactus caespitosa sp.n. C. Backeberg



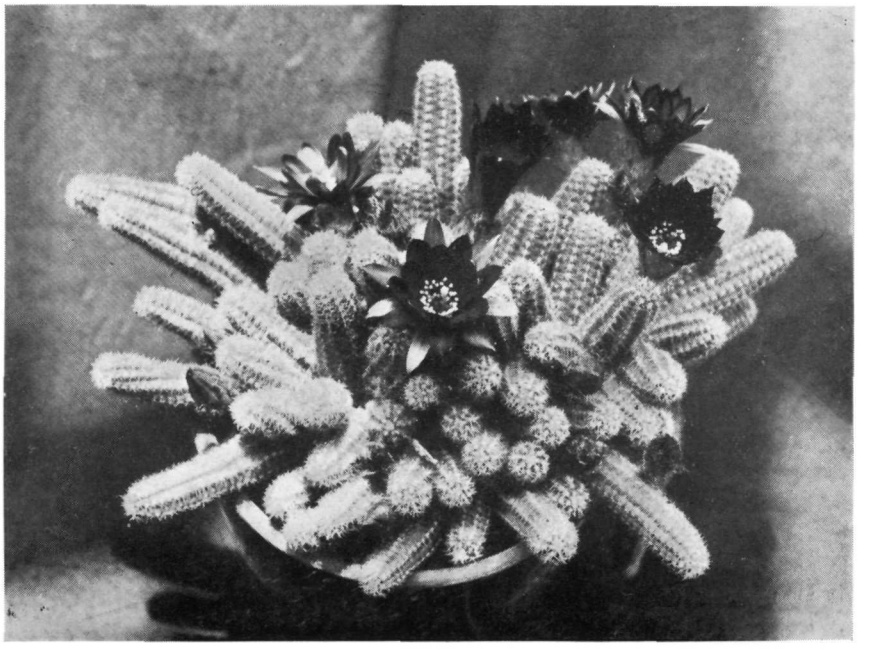
Mammillaria subtilis sp. n. C. Backeberg

Delosperma Sutherlandii H. Herre

Delosperma Sutherlandii H. Herre

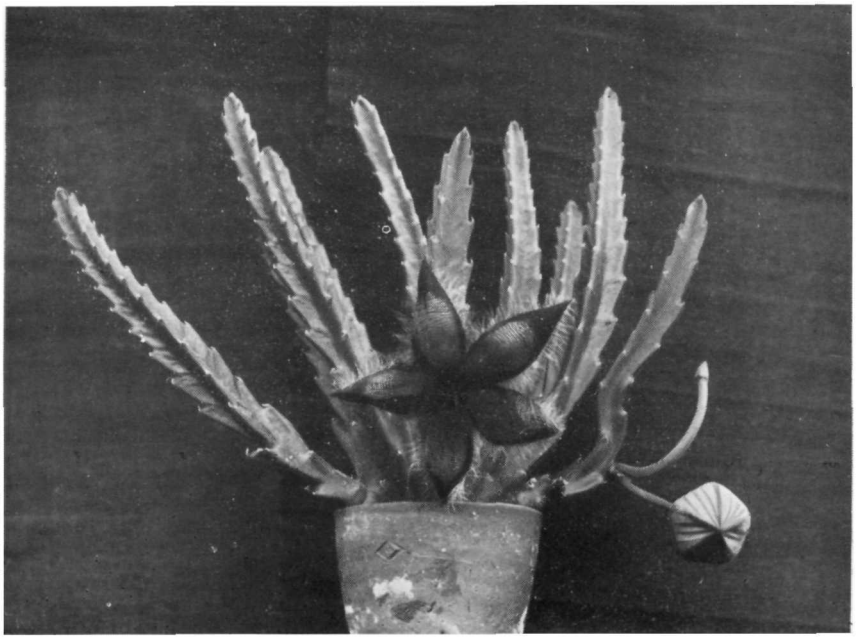


Mammillaria Schelhasei W. Beeson



Chamaecereus Silvestrii W. Beeson

Echinocereus pentalophus W. Beeson



Stapelia grandiflora W. Beeson

It will be noticed during very hot sunny spells, that some plants will shrink into the soil to hide their leaves from the sun, especially the very windowed types. This usually occurs when they are placed near to the glass, though they emerge again as the sun loses its power later in the season, or when more water is given.

It is interesting to place the same colour in pebbles, or gravel, as the plants around each species, for in their natural habitats, *Lithops* seem to acquire a similar colouring to their immediate surroundings, giving rise to the name " Living Stones." Whether this adaptation of camouflage is intentional or merely accident has not been definitely proved yet. It is a fact, however, that whitish coloured stemless *Mesembryanthemums* are to be found in districts where the predominant colour of the soil surface is white, such as quartz or granite, and other plants in different surroundings have almost the same colouring as the soil. This certainly helps to protect them from the depredations of wild life and even humans, for they become very difficult to recognise even when a special lookout is being carried on for them. But this camouflage in colouring is not variable, for though some species lose, to a certain extent, their original markings when planted and surrounded by soil of a different colour, such changes are rare and very slow in the extreme. However, it is a very interesting and intriguing peculiarity, and makes these plants all the more covetable. The " windowed " tops of the leaves of *Lithops* (where the green colouring matter is absent) allow the rays of light to penetrate to the chlorophyll below when the plants are almost covered with sand or gravel through the action of the wind in the Karoo of S.W. Africa. In some species this window effect is more obvious than in others, adding greatly to their attraction.

Propagation of *Lithops* is, fortunately, quite easy from seed, as it is very rarely that cuttings can be taken, though older plants may be split up if these are in clusters of separate bodies. Seed raising should present no major difficulty to members of this Society if they have read the many articles by Mr. Boarder on the subject. The technique for *Lithops* is the same as for other species and should present no trouble. It is imperative that drying out of the surface of the soil in the seed pan should never occur, that as much air as possible be given the young seedlings after germination, and that one should try to keep them growing for their first year of life. If sown thinly, they can remain in the seed pan for the first year, but should be pricked off if danger from squeezing through being too thickly sown is imminent. Always take care when handling seedlings of any species not to break the roots when digging them out of the soil, and to make sure that the roots are buried properly when transplanting.

There are a good many species to choose from, some newly discovered and a proper description of each would take up more pages of this Journal than can be spared, so I will just list a few of the more easily obtained and popular types.

The flowers, in yellow and white, scented in some cases, are very pretty and bright, opening out during the afternoon and closing up later in the day. The body and leaf colourings are infinitely varied and lovely, each in itself, and mere words can hardly describe what really must be seen to be appreciated, so that names can mean very little other than a medium for the collation of the species.

L. aucampiae, L. opalina, L. Helmuti, L. bella, L. Peersii, L. insularis, L. Bromfieldii, L. olivacea, L. Triebneri, L. Edithae, L. pulmonuncula, L. summitatum, L. karasmontana, L. Lericheana, L. rugosa, L. Lesliei, L. pseudo-truncatella, L. salicola, L. kunjasensis, L. terricolor, L. Vanzylii, L. Marthae, L. umdausensis, L. Schwantesii.

The participation of the Berks and Bucks Branch in the Windsor Rose Show was a triumph for Mrs. Stillwell, Mrs. Wells and Mrs. Dyke. They staged ten classes and Mrs. Stillwell gained five firsts, two seconds and two thirds ; Mrs. Dyke, five seconds and three thirds ; Mrs. Wells, five firsts, two seconds and three thirds ; Dr. Jacobs, one second ; Miss Jensen, one third. Mrs. Stillwell also set up a six-foot honorary exhibit and was given an Award of Merit. Judge : Mr. A. Boarder.

Bromley (Kent) Branch holds monthly meetings at 37 Cromwell Avenue, by the courtesy of Mrs. Preist, at which news is exchanged, talks given, exchanges arranged and difficulties discussed. They staged an exhibit at the Hayes (Kent) Horticultural Show which aroused much interest, Mr. K. H. Walden acted as Judge. Mr. M. S. Border staged a one-man show at the Fete at the K.B. Works, Foots Cray.

OBSERVATIONS ON MESEMBRYANTHEMUMS

A lecture by Mr. W. DENTON to the West Kent Branch

In the lifetime of our society I have seen more and more people become interested. Their requirements are fairly simple, you can grow a large number in a small space. They require little heat in winter, are progressive in growth, showing changes in the plant bodies each year in a number of the species. They are not expensive, are easily raised from seed which is obtained without much trouble, in two or three years they make good plants that flower freely.

If your garden is small and you have no greenhouse, build a frame, it is ideal. Have it raised up to about three feet high, on brickwork, fill the lower half with any old soil, and finish off with six inches of coarse sand. Plunge the pots in this, bringing the plants to about nine inches from the glass. Plenty of air and light is so very necessary to successful cultivation, together with some simple form of heating with the modern electric seed raising hotplate or buried cable. As watering is so important I want to make it a special point, no hard and fast rule can be laid down, each plant has to be taken on its merits and treated accordingly, the plunging method is so valuable, little water will be required at any time owing to the natural dampness of the sand and the pots are always cool and so avoid the small tender roots getting burnt.

All plants require a certain amount of lime in the soil, preferably old mortar rubble, crushed fairly fine. Make up a rough mixture of two thirds good loam, one third Bedfordshire sand, lime rubble and a little charcoal. Add to this, at the time of potting, extra coarse sand and in some cases with large plants a pinch of hoof and horn manure, drainage is provided by the large siftings of Cornish sand. Soil is not all that important, always provided it is open. Use John Innes Compost and add a little extra lime and sand to suit. Limestone grit, as fed to chickens, can be used for drainage and a little in the soil for the larger plants.

The most popular of the group is the *Lithops* family; when grown hard in full sun, they have a lovely colour. They require fairly deep pots. They require a little water from early May onwards when the old stems are nearly only a dry skin. After they have flowered, gradually ease watering and leave dry the whole of the winter. When in doubt, leave the water pot alone, they never die with dryness, water can be the deadly medium.

Conophytums are a vast group of easy culture, they grow well and increase very quickly and you can depend on flowers. They have short, bushy roots, never more than 1½ in. to 2 in. long. About mid-April these plants show a change of colour in the stems, this denotes their approaching rest and no more water must be given. New bodies are forming inside, nourished by the sap of the old stems. Leave dry the whole of the summer, do not feel worried about their appearance, they will look like dead leaves, on no account water at this stage. About August the new growths push their way through the dead stems, very often two instead of one. When the stems are nearly full size I like to remove the old skins with a pair of tweezers to improve their appearance, but be very careful the old stems are only dry skins. In their native habitats these old leaves form a protection from the grilling rays of the sun. There are some lovely little plants in this genus : *calculus*, a perfect round globe, *pellucidum*, a gem with white flowers, and so you could go on.

Window plants are great favourites. There are two varieties, *Fenestraria aurantiaca*, yellow flowered, and *rhopalophyllum*, white. They have real windows in the top of the leaves and are most interesting, in this country the leaves have a tendency to become elongated, but in South Africa the leaves are nearly round. They grow on sandy flats, nearly always covered with sand, with only the glassy tips peeping out. Keep them close to the glass. In early summer they start to grow, when they should be watered, gradually reduce water towards the end of August, after flowering, and keep dry all the winter. They require more sand than most of our plants, two thirds of the pot, coarse Bedfordshire sand, in long deep pots. Small plants grow rapidly and I had one with five flowers last summer. In raising from seed, an early start should be made so as to have seedlings ready to be pricked out by mid summer. Transfer to deep pans or pots about one inch apart. Keep like this for the rest of the summer and the whole of the winter.

Before leaving window plants, there is one that should be in all collections, *Frithia pulchra*. This is a grand flowerer with a rough top to its window, a real gem.

My own favourites in the mimicry section are the *Titanopsis* which are summer growers and require a fair amount of water when active. They tell you when they want water, notice the centre of the plants when the small leaves begin to push out. Frame culture is very suitable for them as they get plenty of air and avoid burning of leaves. They are a little tricky in winter. I like a little warmth to keep out damp atmosphere.

Cheiridopsis candissima ; notice the leaves united throughout their length when resting, for protection against the sun. These plants are not so pretty to look at and a bit on the difficult side.

Pleiospilos are very interesting. I have a plant of *Bolusii* growing for me for twenty years. It had to rough it through the war period, still it flowers every year and is a genuine piece of living rock. New leaves are on the way now and can be clearly seen in the centre of the old ones, never water these plants till the old leaves are denfiitely dead. About the middle of July give a very little water. They are very dry subjects.

Another plant stores up its succulence in the form of a large tap root, *Nananthus vittatus*, it grows in summer and flowers fairly well, a little extra coarse sand is suitable and very deep pots.

Two last points, I never water overhead ; if a few drops of water are left on the plants, soak off with a small camel hair brush, or they will form small burning glasses and spot the leaves badly, thus allowing entry of disease to ruin your plants.

Root bug is a bad enemy, very few other pests trouble us. If you become suspicious, there is only one thing to do. Turn the plant out, if you find the bug, dip the roots in methylated spirits with a little nicotine added. After this, soak the roots in clean water for a few moments, shake the wet roots in perfectly dry sand to separate the tiny fibres and you are then able to re-pot at once. Rub a little flake napthaline or a moth ball over the bottom of the pot, near the drainage hole. Do make sure that every flower pot is perfectly clean.

DELOSPERMA SUTHERLANDII (Hook f.) N.E. Br.

By H. HERRE

Among the genus *Delosperma* of the *Mesembryanthemaceae* there are some extremely beautiful flowering ones which have very big, showy flowers. There are approximately 120 different species of this genus which, mainly, concentrate on the Eastern districts of the Cape Province, also in Transvaal, the Free State and Natal, and occurring in East Africa up to Abyssinia. Most of them have small or middle sized flowers which gradually develop into capsules wherein the seeds are formed. It is from the structure of the fruit that the generic name is derived. As the capsules have no roofing membrane over the cells, the seeds are not at all hidden when the capsule opens as it becomes wet, because " delos " means " not hidden " and " sperma "=seeds. Thus the name is a very adequate one.

D. Sutherlandii was sent to Kew Gardens in 1870 by Dr. Sutherland from Natal, and as it proved to be a new species, it was named after him. There is a good coloured plate of it in the Botanical Magazine (1877) t. 6299.

The plant is a perennial, growing only during the summer. In autumn it dies down and only the stem with the roots, which bear some curious small, potato-like tubers, is left in the ground. The velvety hairy branches reach 8—15 cm. in length and are upright, or lie down upon the ground. The leaves are short, connated at their base, oblanceolate, acute to acuminate, fleshy, on the upper surface slightly deepened towards the middle, while on the lower side a keel-like vein is formed. The leaves are 5—8 cm. long and approximately 2—3 cm. broad, green, finely papillate and, along the margin, somewhat recurved and shortly ciliate. The pedicel is terminal, but as the branch grows on, it becomes more axillary. The pedicel here is about 3 cm. long, while in Europe it is more etiolated and becomes up to 10 cm. long. The calyx is hemispherical. Five lobes are formed and these are obtuse and shorter than the petals. At least two of them are membraneous marginated. The petals form one row. They are obtuse, sickle-like, axillary bent over, violet pink, e.g., according to the Horticultural Colour Chart, mallow purple to mauve (=630 to 633). In the centre of the flower are the numerous yellow stamens, surrounded by staminodes. There are five stigmas, which are oviform, thickened and subulate acuminate. The flowers reach a diameter of three inches, but there are others too, which are only two inches in diameter. When in full flower, the plants are covered by them and resemble a piece of silk lying in the sun. It is an unforgettable sight !

In cultivation, the plant is not difficult at all, as it will stand a good amount of moisture during its vegetation period in summer, while in winter it must be kept quite dry to prevent rotting. By the way, the biggest flowers among the *Mesembryanthemaceae* are those of *Carpobrotus edulis* (L.) N.E. Br., which may reach 5—6 inches across, but as the plants are vigorous rank plants creeping on the ground, they are not suited at all for the amateur who has only a small place. Here the *Delosperma* is in the right place, especially as it can also be raised from seed without much difficulty. Hence it can be really recommended for a trial.

REPORTS OF MEETINGS

May 2nd, 1950 : A. Boarder : Potting Demonstration

Plants can only absorb nourishment in soluble form and the soil must be rich and in good heart, open for air to penetrate, with some chemicals and salts, a small trace of magnesium, iron, nitrate of phosphates and potash. For potting you need good sandy loam with some chalk. Kettering loam has a small amount of clay containing silt, which is advantageous, also fibres of grass roots which have been manured by cattle. This is cut five inches thick and stacked for six months, and wetted when stacked. Peat is a second component, the darker it is the more it is decomposed, lighter peat holds moisture well. Next is sharp sand, such as Thames washed sand.

For seed compost two parts loam, one part peat, one part sand. For older plants, seven parts loam, three of peat and two of sand. Lime is necessary, but only ¾ oz., 1½ oz. super phosphates, ¾ oz. sulphate of potash, 1½ oz. of hoof and horn grist, to a bushel of soil. Rub well and spread the loam first, then add the peat ; sprinkle fertilisers in the sand and mix well, add a sprinkling of charcoal to keep the soil open, a couple of handfuls to a bushel of soil will suffice.

Re-pot before plants start too much growth, but not in winter. Even if in bud, they will continue and flower ; a *Mammillaria bocasana* has seventy-three flowers on it after re-potting in January.

Watering by immersion causes essential mineral salts to run out at the bottom. When filling your pots, put a piece of charcoal in the bottom with fine charcoal over it, for drainage. Soak pots for two or three days and let them dry before using. If offsets touch the sides, put plant into a larger pot. If not convenient to re-pot, use John Innes Liquid Feed and water once a week. Be careful of labels, take them out and put in a safe place. Take off top soil and look for root bug. Cut out any part that is diseased, apply a little flowers of sulphur and put in the nursery bed, the scar will skin over and will then root. When there is a good root you can pot up. In potting, keep plant upright and work in sufficient soil for the plant to stand and lightly press down, leaving ½ in. or so for watering. See soil is damp and let it remain for about a week, according to conditions. When re-potted, plants need all the sun and air they can get to make roots.

June 13th, 1950 : Brains Trust

Several questions were put on various phases of cultivation and other matters and the trust was kept busy with its varied answers. A general resume of the matters covered is as follows :—When *Rebutia minuscula* has pinkish growing centres it is probably due to lack of chlorophyll, under nourishment, with a tendency to bronze. *Rebutias* flower from the base, not at the growing point. Hairs on seeds, such as *Ceropegia Woodii* and many other plants are provided as a means of aerial propulsion for distribution purposes. To get rid of worms in a pot, without disturbing the plant, water with a dark pink solution of permanganate of potash or lime water which brings the worms to the surface when they can be picked off.

Centipedes are shiny dark brown or yellow, and move fast, they are carnivorous, eating other harmful insects and are a help to growers. Millipedes are small worm-like insects, pale cream colour, move slowly and curl up when disturbed. It is herbiverous, lives on roots usually and is harmful. Do not confuse them with each other, a good rule is that fast moving insects are usually the helpful ones to the gardener. Tips of plants drying up may be caused by watering or spraying if the globules of water are left for the sun to act upon, but more usually it is due to some check in growth or under nourishment which cannot reach the upper parts of the plants, or it may be roots are not healthy. Sun or frost may scorch plants. Give shade and gradually nurse back to health, but examine roots and re-pot. Rust marks on *Opuntias* are often due to dampness and lack of ventilation. Flowers of sulphur sometimes prevents them spreading, if not cure them. Some cacti flowers are self fertile, others set seed with no apparent fertilisation, some defy pollination by nearly related species and can only be fertilised by plants of their own species. Some of the *Mammillarias* do not develop seed pods till a year after flowering. Reddening or bronzing of plants can only be corrected by a little more shade. It is difficult to revert the colour to green, but new growth will be encouraged to be green by more generous shade treatment. It is said that root bug will cause bronzing by causing the plant to starve. Red on some plants is typical. On *Epiphyllums* it is usually regarded as healthy sign and a forecast of flowers to come.

July 11th, 1950 : A. Boarder : Exhibition Comments

It was with great regret that we learned that our President had passed away. Mr. Farden acted as Chairman of the Society for many pre-war years. Age and affliction prevented him taking more intimate interest in the Society since the war, but he will always be remembered for his collection of *Haworthias* which he donated to Kew. The kindly nature of this grand old man endeared him to all.

Also with regret we learned that our Vice-President, Mrs. V. Higgins, felt she could not continue in office. She had been elected in recognition of many years of service as secretary and editor from the inception of the society. Her work for the society and our plants is well known that it is unnecessary to enumerate them, but she has carved her name indelibly on the annals of our subject. Captain H. J. Dunne Cooke was elected Vice-President to fill the vacant position.

Mr. Boarder then commented on the exhibition and stated the plants were the best in quality and in quantity since the war. The general public, even more than ourselves, continued to show a very lively interest in the plants on show. In regard to seedlings, Mr. Boarder felt the time limit of nearly three-and-a-half-years was too long and it was decided that for the September Exhibition the limit should be after January, 1949. When entering in general classes, such as three cacti, members should endeavour to exhibit different genera.

It was unanimously decided that Mr.W. Denton should act, with Mr. Boarder, as judges at the September Show.

After a vote of thanks to the two Judges, a further vote of thanks was passed for Mr. Walden and Mr. Denton and others who had helped so much in making the Show a success, especially Mr. Walden, who had, each year, so generously taken over the arrangement of the table and had attended all the time and supervised everything in connection with the Show.

August 29th, 1950 : Miss E. F. Kelly : Succulent Plants

At the commencement of the meeting it was with regret that we learned of the death of Miss Mackenzie, Treasurer to the society since the war until she was compelled to resign, for health reasons, at the end of 1948. Further sad news was received when we learned that Mr. J. Westlake had passed on. He was a very well-known personality who had been with the society continually from the commencement in 1931, and was one of those who attended the Inauguration Meeting at St. Bride's Institute. Both these notable members of the society will be long remembered for their sterling qualities and their companionable nature.

Miss Kelly then proceeded with her talk which covered the whole range of succulent plants, and was interspersed by running comments from the audience. Interruptions usually are very reprehensible, but they were all good humoured and added to the enjoyment of the lecturer and audience alike, Miss Kelly, by virtue of her position at Kew, was able to discuss many plants and many incidents in her daily work. A rather refreshing talk which was such a departure from the usual routine lectures on cultivation—a chatty ramble was appreciated by everyone.

September 12th, 1950 : A. Boarder : Exhibition Comments

Mr. Boarder was pleased to note the continued improvement in the quality of the exhibits. He dealt with each class in rotation and his comments satisfied exhibitors as to the fairness of the judging. It is really remarkable to listen and hear the minute points that are considered when judging takes place, and it creates much confidence that when we show our plants they get real detailed consideration. Mr. Boarder admitted that it was possible for judges to make mistakes, but by method and patience every care was taken to see that the placings were accurate, but that it was possible for an exhibit to be placed second instead of first for very small details, such as the presence of one or two of that pest to all cacti—the mealy bug ; an exhibit was often demoted because of the moderate appearance of one plant. It was often necessary to compare plant to plant before it could finally be decided which justified first place. Often judges disagree on the placings, but with this show the two judges were unanimous in every case.

The meeting showed its appreciation of what had been said and what had been done at the show by passing a hearty vote of thanks to the two judges, Mr. Boarder and Mr. Denton, and also to Mr. Walden and others who had attended and helped to make the show what Mr. Boarder stated was the best Autumn Show since the war.

Subscriptions are renewable on the 1st January, 1951. All members are requested to remit to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, the sum of 21/- for their renewals as early as convenient, but certainly not later than the 1st January, 1951. If you would be good enough to do this it will be very much appreciated as it saves a great amount of work and expense if renewals are paid up promptly.

A PROPAGATOR FOR SEEDS

By Mrs. M. STILLWELL

For more than a decade it has been practically impossible to import cacti plants owing to the currency restrictions. Cacti enthusiasts, forced by these circumstances, have turned their thoughts more and more to obtaining plants by germinating from seed as seed is frequently obtainable, certainly in much greater quantity than plants.

Many find success in their germination, but an even greater number fail. Without doubt, that is because of their methods, but an even greater cause is the lack of an apparatus suitable for their purpose. They find so many of the commercial propagators are difficult to manage, or to combine with the germination methods applicable to cacti. In principle, a propagator that will deal with vegetable seeds should also apply to our plants, but for many reasons it is not found to be so in practice. Another reason is often the unreasonable cost of commercial apparatus.

I have grown cacti for years, but have suffered from my inability to increase my collection by imports, whether direct or through our dealers who are also unable to import in any quantity, and I have also turned my endeavours to germinate from seed. I have used and tried all sorts of methods, but for one reason or another, possibly my own incapability, I have had many failures, but arising out of my past experiences I have, eventually, found a method which is as near fool proof as anything could be and I have proved it to be a perfectly successful one.

I do not propose to go into the principles of germination as these have so often been dealt with by Mr. Boarder in the Journal. I will confine my remarks to the propagator to which Mr. Boarder's advice can easily be applied.

All that you need is six bricks, one small heavy-bottom night lamp, as can be purchased at Woolworth's for little more than a few pence, a biscuit tin without a lid, a thermometer and three pieces of glass. A very modest equipment, do you not think ? But as the drawings in the illustration pages show, this is all that is required to have a perfect propagator.

First put down the heavy-bottom night lamp. On each side of this lamp put two single bricks, one each side and on the other two sides put two bricks on each side, six bricks in all. The apparatus will then look like fig. 1.

Then you put on top of the two double bricks your lidless biscuit tin, with the solid bottom below, over the lamp. The second brick on each side lifts the biscuit tin sufficiently to prevent actual burning, but allows sufficient, and the correct amount, of heat to heat up, but not burn the tin. By the way, scrub off the paper from the sides of the tin or they might ignite ! It will be seen that having two bricks on each of two sides and only one brick on each of the other two sides has left a gap between the one brick sides and the bottom of the tin. Put a sheet of glass to cover up these gaps. The gaps will enable you to see that your lamp is functioning correctly, but they also permit air to get in and so the light is not put out and the heated air increases the efficiency of the biscuit tin as a propagator. All you then have to do is to put another, larger, sheet of glass, a little larger than the open top of the tin, over the top of the tin. Your contraption will then look like fig. 2.

Buy a small photographer's thermometer from Boots'—with a hook at the top, hang it over the top edge of the tin.

Now you are ready, with the apparatus complete for use. Remove the glass sheet from the gap on one side and remove the brick beneath it. Withdraw the night lamp and fill it, light it and replace, also replacing the brick and the glass sheet. Do not worry about air as the hollows in the bricks permit it to get under the glass to the inside cavity and your light will shine brightly and heatedly. If you enclose the top of the tin with your larger piece of glass as already stated, it will not be long before the inside of the tin will be quite hot. By this method you can maintain a regular heat of approximately 70 degrees, according to the height of your light.

You will be well advised to examine the night lamp each day and fill up so that your lamp will not go out one cold night and so ruin all your work. It is best to do this examination and refilling in the late afternoon when you can do it by daylight.

Leave the apparatus to warm up until, by adjustment, your thermometer shows a steady 70 degrees, then you can proceed.

Prepare your pan in accordance with the instructions Mr. Boarder has so often given you, sow your seeds. Take off the larger piece of glass at the top of the tin, put first a large flower pot saucer there, pour some water into it, see it is not cold, and then in the centre of this flower pot saucer place your pan with the sown seeds. The biscuit tin will then look like fig. 3. Your apparatus will then be working for you so long as you require and tend it.

If you follow Mr. Boarder's instructions this apparatus will germinate your seeds within a week. It is the best method I have ever tried and I know you cannot go wrong.

EXHIBITION, JULY 10th and 11th, 1950

Judges : A. Boarder and Captain H. J. Dunne Cooke. In charge of Exhibits : K. H. Walden

Class 1 Three *Echinocactanae*. 1, Mrs. M. Stillwell ; 2, P. V. Collings ; 3, R. H. West ; V.H.C., H. J. Aylott.

Class 2 Three *Coryphanthanae*. 1, P. V. Collings ; 2, E. Shurly ; 3, Mrs. M. Stillwell ; V.H.C., R. H. West.

Class 3 Three *Cereeanae*. 1, R. H. West ; 2, P. V. Collings ; 3, Mrs. M. Stillwell ; V.H.C., Miss J. Neave.

Class 4 Three *Echinocereeanae*. 1, Mrs. M. Stillwell ; 2, R. H. West ; 3, H. J. Aylott.

Class 5 Three Cacti. 1, R. H. West ; 2, P. V. Collings ; 3, Mrs. M. Stillwell.

Class 6 One Specimen Cacti. 1, P. V. Collings ; 2, E. Shurly ; 3, Mrs. J. A. Wells ; V.H.C., Mrs. E. Shurly.

Class 7 Cacti seedlings sown after 1st January, 1947. 1, H. N. Judd ; 2, R. H. West ; 3, Mrs. J. A. Wells ; V.H.C., Miss D. M. Poore.

(Winner's plants from Mrs. Nevin's seeds distributed by the Society.)

Class 8 Cacti seedlings more than three years old. 1, K. H. Walden ; 2, P. V. Collings ; 3, R. H. West.

Class 9 Miniature Gardens. 1, R. H. West ; 2, Mrs. J. A. Wells ; 3, Mrs. Pryke Howard.

Class 10 Three *Mesembryanthemums*. 1, Mrs. M. Stillwell ; 2, P. V. Collings ; 3, J. W. Joyce.

Class 11 Three *Haworthia, Gasteria/Aloe*. 1, P. V. Collings ; 2, A. J. Edwards ; 3, Mrs. M. Stillwell ; V.H.C., H. N. Judd.

Class 12 Three *Euphorbia*. 1, Mrs. M. Stillwell ; 2, P. V. Collings ; 3, A. J. Edwards ; V.H.C., H. J. Aylott.

Class 13 Three Succulents. 1, Mrs. D. Shurly ; 2, Mrs. M. Stillwell ; 3, Mrs. Pryke Howard.

Class 14 Succulent seedlings sown after 1st January, 1947. 1, K. H. Walden ; 2, Mrs. M. Stillwell ; 3, Miss D. M. Poore ; V.H.C., Mrs. J. A. Wells.

Class 15 Six Succulents. 1, Mrs. Pryke Howard ; 2, Mrs. M. Stillwell ; 3, K. H. Walden ; V.H.C., P. V. Collings.

Non-competitive Exhibits : W. Denton, *Amateur Gardening* Bronze Medal for a very fine collection of cacti and succulents.

Captain H. J. Dunne Cooke : *Amateur Gardening* Award of Merit for a collection of *Mesembryanthemums*.

In regard to Mr. Smith's article in the July issue, Mr. Uitewaal writes :—" Mr. G. G. Smith is, apparently, of the opinion that he may lay claim to having been the first to record the differences in the perianth, i.e., the triangular and the hexagonal perianth base in connection with *Haworthia*. Amongst others, Berger (1908, p. 15) referred to these differences within the *Aloinae*. I also mentioned them before Mr. Smith published anything on this subject. I would refer to my ' First Attempt to Subdivide the Genus *Haworthia* on Floral Characters ' in Desert Plant Life, 1947, pp. 132—136. I first clearly drew attention to the distinct correlation between these (and other) flower characteristics and vegetative characteristics, so that these flower characteristics could be used as a basis for a key for the subdivision of the genus in a more natural way, into two (and more) sections, perhaps even sub-genera. A key, based on flower characteristics, was published by me at the same time. Mr. Smith not only tries to discourage others making a serious study of the subject outside Africa, but also endeavours to appropriate to himself the good work done by the ' overseas botanists ' he deplores. Mr. Smith forgets to cite the publication which would entitle him to my claim."

" Wild Flowers of the Cape Peninsula," by M. M. Kidd, foreword by Field Marshal The Rt. Hon. J. C. Smuts, contains some succulents and should interest all concerned in the flora of South Africa. The price is £2 and can be obtained from Miss M. M. Kidd, P.O. Box 22, Rondebosch, South Africa.

EXHIBITION, SEPTEMBER 12th and 13th, 1950

Judges : A. Boarder and W. Denton. In charge of Exhibits : K. H. Walden.

Non-competitive Exhibit by Mr. W. Denton.

Class 1 Three *Echinocactanae*. 1, Mrs. Pryke Howard ; 2, Mrs. M. Stillwell ; 3, R. H. West ; V.H.C., H. J. Aylott.

Class 2 Three *Coryphanthanae*. 1, Mrs. M. Stillwell ; 2, E. Shurly ; 3, H. J. Aylott ; V.H.C., R. H. West.

Class 3 Three *Cereeanae*. 1, Mrs. M. Stillwell ; 2, R. H. West ; 3, H. J. Aylott.

Class 4 Three *Echinocereeanae*. 1, R. H. West ; 2, Mrs. M. Stillwell ; 3, H. J. Aylott.

Class 5 Three Cacti. 1, R. H. West ; 2, E. Shurly ; 3, E. Wyman ; V.H.C., Mrs. Pryke Howard.

Class 6 One Specimen Succulent Plant. 1, Mrs. M. Stillwell ; 2, Mrs. Pryke Howard ; 3, E. Shurly.

Class 7 Three *Faucaria/Stomatium*. 1, E. Shurly ; 2, Mrs. Pryke Howard ; 3, A. J. Edwards ; V.H.C., Mrs. M. Stillwell.

Class 8 Three Stemless *Mesembryanthemum*. 1, Mrs. M. Stillwell ; 2, A. J. Edwards ; 3, E. Shurly.

Class 9 Three *Haworthia, Gasteria/Aloe*. 1, E. Shurly ; 2, Mrs. M. Stillwell ; 3, Miss M. Lawrence.

Class 10 Three *Euphorbia*. 1, A. J. Edwards ; 2, E. Shurly ; 3, Mrs. M. Stillwell.

Class 11 Three *Crassula*. 1, E. Shurly ; 2, Mrs. M. Stillwell ; 3, Mrs. Pryke Howard ; V.H.C., A. J. Edwards.

Class 12 Three *Echeveria/Cotyledon*. 1, Mrs. M. Stillwell ; 2, Mrs. Pryke Howard ; 3, H. J. Aylott.

Class 13 Three Succulent Plants. 1, Mrs. M. Stillwell ; 2, Mrs. D. Shurly ; 3, H. J. Aylott.

Class 14 Seedlings sown after 1st January, 1949. 1, Mrs. D. Shurly ; 2, Mrs. M. Stillwell ; 3, Miss D. M. Poore.

Class 15 Three Cacti/succulents in living rooms. 1, Mrs. G. N. Hurford ; 2, Mrs. E. Luker.

Class 16 Photographs. 1, Dr. E. Elkan ; 2, W. V. Cole.

Class 17 Group of Cacti and Succulents. *Amateur Gardening* Bronze Medal, P. V. Collings ; *Amateur Gardening* Award of Merit, K. H. Walden.

Winners of Sir William Lawrence Cup for cacti : R. H. West.

Evelyn Theobald Cup for succulents (other than cacti and *Euphorbia*) : Mrs. M. Stillwell.

P. V. Collings Cup for *Euphorbia* : equal points, Mrs. M. Stillwell and A. J. Edwards.

Mr. Tom Gill, of Wolverhampton, comments, in regard to cacti surviving the winter, that owing to shortage of greenhouse space, he winters, under 7 ft. 6 in. long cloches, cacti and succulents including various *Opuntia*, *Mammillaria* seedlings, *Gymnocalycium multiflorum*, *Echinocactus Grusonii*, *Agave Victoria-reginae*, *Haworthia* and a mixed assortment of *Lithops*, *Dinteranthus* and other *Mesembryanthemum* and a number of other cacti and succulents. The only extra protection on frosty nights was a tarpaulin. All the plants look healthier and flowered better during this season.

" The *Aloes* of South Africa," by G. W. Reynolds, with a foreword by Field Marshal The Rt. Hon. J. C. Smuts, will appear in December, price £3 13s. 6d., and can be obtained of The Trustees, *Aloes* of South Africa Book Fund, P.O. Box 2097, Johannesburg, South Africa. From reports received, this will be an exceptionally fine production and will establish a new record in fine books on our subject.

The Sherman Hoyt Trophy was competed for on September 12th and 13th at the Royal Horticultural Hall. Judging was extremely difficult and only one placing was awarded, the trophy going to Mrs. Stillwell ; other entries were P. V. Collings, Captain H. J. Dunne Cooke, and S. G. Fiedler. Mrs. Stillwell owed her win for the clean, good and well-displayed plants rather than for rarity and fully deserved her success. Special mention should be made of Mr. Collings' *Mammillaria plumosa* and *Schiedeana*, the latter must be unique in health and colouring—probably his wandering insects are responsible ! Mr. Fiedler's exhibit included a very nice lot of *Aeonium*.

One of the final notes to the Journal was on the health of Field Marshal The Rt. Hon. J. C. Smuts. Unfortunately, this has to be replaced by the notice of his passing. Internationally known, and honoured, he has a special memory for us in the succulent world. General Smuts, as he was better known, was an ardent collector of plants, and our own in particular, and he wrote the foreword for many books on our subject, and those who possess Hutchinson's " A Botanist in South Africa " will have keen memories of photographs of General Smuts accompanying the expeditions described in that book. His name will long be remembered by us for his part in our interests as well as the larger and greater part he played internationally.

It is with the deepest regret that we learn of another leader in the succulent world has passed on, Mr. Ferdinand Schmoll, the well-known Mexican collector and dealer in cacti. His work amongst us for so many years is well known and without him we should not have enjoyed so many fine plants. We offer our sincere condolences to Mrs. Caroline Schmoll, herself an authority and an enthusiast of our plants.

Mrs. E. Philip, of Burgh Heath, has been good enough to donate a copy of Van Laren's Vetplanten and one of Cactussen (Dutch Editions) to the Library.

Subscriptions are renewable on the 1st January, 1951. All members are requested to remit to the Hon. Treasurer, Miss D. M. Poore, 48 The Mead, Beckenham, Kent, the sum of 21/- for their renewals as early as convenient, but certainly not later than the 1st January, 1951. If you would be good enough to do this it will be very much appreciated as it saves a great amount of work and expense if renewals are paid up promptly.

In checking the proof for the Journal, the editor finds he has omitted the illustration that should accompany Mrs. Stillwell's article " A Propagator for Seeds." This will be printed in the January 1951 issue. The editor apologises to Mrs. Stillwell and our readers for the omission.