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EDITORIAL

With this number commences the tenth volume of the Journal. From comments received from home and abroad, it is obvious the Journal fills a very decided want and the worried letters that come when Journals are, occasionally, a day or two late, indicate how members await its appearance.

I take this opportunity of thanking all those who have so generously contributed articles, etc. and have, thereby, assisted me in the task I have undertaken, only too inadequately, I am afraid. I would like to mention all, but the list is far too long, but special mention should be made of Messrs. A. Boarder, W. Taylor Marshall, G. G. Green, J. R. Brown, A. J. A. Uitewaai and Mrs. V. Higgins.

I have to apologise to those who have sent photographs for this number including Messrs. H. Hall, L. O. Ollason (Australia), H. Jacobsen, A. J. A. Uitewaai, G. G. Green, Mrs. Mikelson and a fine quintet from Captain H. J. Dunne Cooke. Such an overflow was a complete surprise and uniquely unusual, as normally I have quite a lot of trouble to fill up with illustrations and I was planning to illustrate this number with photos from members. They will all, however, appear in due course.

I have suggested to the Council to encourage cactus photography by including a class for photographs at our two Exhibitions this year. This side of our subject needs development and past cactus publications, all over the world, prove how much better photographs would assist collectors. Why two Exhibitions? That in June provides for cacti and succulents in bloom, the October show is ideal for such as stemless *Mesembryanthemums*.

This number includes my first essay as an author of new plants. I have others for description, but in some cases I must await flower and fruit and, in others, I must exercise every precaution as I am not completely satisfied they are new. I dislike naming plants after individuals, except in special circumstances, and prefer to name after some characteristic which assists identification, but the wishes of those from whom the plants come must be recognised.

In this number, also, is my oft threatened Notes. The present one is on *Mammillarias*, my subject, but I have not the slightest intention of confining it to *Mammillarias* and I, therefore, depend upon you to send me notes of other genera so that the title can truly be spread over the whole of the genera of cacti and succulents.

Owing to the misreading of the hand-written naming of a *Lithops*, under an illustration in the last issue, it was printed as *L. Otrerianus*. It should have been *L. Otzeniana* Nel.

If you have not already remitted your subscription of 21/- for 1948, please assist by remitting without delay to the Hon. Treasurer, Miss H. Mackenzie, 24 Buxton Gardens, Acton, London, W.3.

CULTURAL NOTES

By A. BOARDER

The New Year always brings forth the urge to sow seeds of Cacti and succulents, and also the anticipation of watching for new growth on established plants. I hope that 1948 will prove as successful a year for the growing of these plants as was 1947. The abundant sunshine of that year did a great deal towards producing a generous crop of flowers, and we can only hope to get a fair amount of sun this year to help us in our efforts.

We should ask ourselves the questions now as to whether we can rectify any mistakes which we made last year, and whether we have learnt anything more about growing and flowering our plants, either from our own experiments or from those of other members. I think that it is possible to learn something each year if it is only a new method of growing a particular plant.

The main task, in the early part of the year, is to prepare all pots to be ready for repotting. See that they are cleaned and sterilised, and that you have a good drainage material to use for crocks. You will find that charcoal is excellent for this purpose. Now make a complete survey of your plants. First clear one part of the greenhouse and then place there all those plants which you consider need repotting. I think that all cactus plants should be repotted at least once a year, and a little thought on the subject will soon convince anyone of the advantages to be derived from this practice.

I have remarked before how the soil in a pot will have lost practically all its nourishment in the course of a year. It will, doubtless, have become stale through repeated waterings, and so should be changed. I know that many members will say that they cannot repot all their plants as there would be no room in the greenhouse for all the larger pots. It is not always necessary to put the plants in larger pots, it depends on how much growth they have made.

Each member should use discretion as to whether a large plant should be repotted or not, but in any case some of the soil should be changed. This can be done by carefully removing some of the soil at the top of the pot, without damaging the roots, and then filling up with fresh soil. In view of the article on potting in the last Journal, I do not intend to say any more about it at this stage; instead I should like to give a little advice on the best kinds of Cacti and other Succulents for members to grow who have only a limited space available. To the owner of a small greenhouse I say, unreservedly, try to concentrate on the smaller growing kinds when you will be able to house up to four hundred different plants in a greenhouse only ten feet by six. If, you on the other hand grow large types such as *Cereus*, *Opuntias*, etc., you will find that you will be greatly restricted as to the number of plants which you can grow well.

Among the Cacti are such small growing types as the *Mammillarias*, *Rebutias*, *Parodias*, *Lobivias*, *Gymnocalyciums*, *Notocactus* and the small types of *Echinocactus*. Among these are to be found many that flower profusely even as small plants, and which have many varied forms although they all remain reasonably small.

The question of specialisation is a very contentious one and I am not going to express an opinion as to whether one should specialise or not. In the past I specialised in *Mammillarias* and, before the war, I had over three hundred different specimens. Now, in this modest collection, although I had many plants which were very unlike any others, I also had many which were so much like other plants as to be almost indistinguishable from them, and I am afraid that they were included only because of their different names. Many were, doubtless, varieties of a species and were so like other plants that I should have been well advised to have dispensed with them so that I could have made room for some *Rebutias*, etc.

In favour of specialisation it can be said that the specialist has a much better chance to study a particular genus and so add to the general knowledge on that genus, and where this is done for the sole purpose of studying that group it would be foolish to confuse the issue by trying to house many other plants outside that group. I feel sure that many members will get a great deal of pleasure in collecting a varied collection of groups which, by their very differences, will make better contrasts and so make a very interesting collection. I think then that specialisation should be left to the very advanced growers.

Among the other succulents may be found very many types which recommend themselves to the grower with limited space. What can be more interesting and beautiful than a varied collection of the dwarf and mimicry types of the *Mesembryanthemums*? Many of these I find very easy to grow and flower, and a few of these can be chosen from the *Lithops*, *Conophytums*, *Argyrodermas*, *Pleiospilos*, *Lapidarias*, *Dinteranthus*, *Faucarias* and *Titanopsis*.

Many of these are easy to raise from seed and they soon make flowering sized plants. At the November, 1947

meeting I exhibited a seedling *Dinteranthus microsperma* which I had raised from seed sown in July, 1946. This plant had a large flower bud and caused considerable interest among some members who wondered whether there would be sufficient sunshine to open the bud. I am pleased to be able to report that the flower opened the next day and has opened each sunny day since and is still alive on 25th November. The flower was bright yellow with a decided stem and, coming from the pair of lobes of the plant, it looked like the tongue protruding from the mouth of a chameleon.

A young seedling *Pleiospilos Bolusii* has just flowered and, being a lovely burnished copper colour, it seemed a wonderful thing coming from such a rocklike plant. Many of the *Conophytums* are very pretty when in flower and some are sweetly scented, some keep open for a few days whilst others only open for a short time, each late afternoon. The *Lithops* are among the finest mimicry types, and whilst the majority have fairly large yellow flowers some have white ones. These *Mesems* may be grown among Cacti but care must be taken to see that they are not watered during their resting period. There is no doubt that where a mixed collection is housed much more care must be exercised in watering them as many may have different resting periods.

On the whole I recommend that beginners, and those with only a few years experience with growing Cacti and Succulents, need not worry about specialising for some time. Once your greenhouse is full up you will then have to consider whether you are going to specialise or not. The usual procedure is for the beginner to collect anything and everything that looks like a cactus. Then when there is no more room in the house the owner starts to look round to see which plants can be parted with. The first to go are usually the large growing *Sedums* and *Mesems*. Then the *Echeverias*, etc., are given away or exchanged. After all the larger succulents have gone, including some of the *Aloes*, the Cacti are looked over and out go the *Opuntias*. Then when room gets scarce, the *Phyllocactus* have to make room for something smaller. This process of weeding out the larger growing kinds goes on until the greenhouse is either used only to house a collection of small growing Cacti or the dwarf *Mesems*. I expect that all those who have kept Cacti over a number of years have gone through these stages, with the inevitable result of many becoming specialists.

Where one is able to extend the greenhouse it may be possible to keep all types, but few of us are so fortunate.

Do not be in too much hurry to start watering your adult plants. As a general rule the plants in a greenhouse can be watered from March onwards, always taking into account the prevailing weather. The whole success of your growing will depend on the way that you can master the art of watering. Anyone can keep cacti alive for years by withholding water from them, but they will not grow without it, and it is when you start to give a plant sufficient water to keep it growing well that the skill comes in. You must learn just when a plant needs watering and when it is unsafe to do so. It is necessary for you to be something of a weather prophet in this watering business and a study of the winds and the condition of the sky is a great help to your weather forecasts over a short period. However, the comprehensive reports given over the wireless are such as to make the individual forecasting unnecessary.

There is never any need to water cacti during dull weather as they do like to dry out fairly quickly. A very heavy watering followed by a prolonged period of dull weather can cause considerable damage to the roots of a plant with the possibility of subsequent loss.

I am often asked whether the off-shoots of an *Echinopsis* or a similar plant should be removed or not. Well, it is an individual taste and one must just please oneself. It is quite natural for these plants to grow into groups, and although you can get the parent plant to grow better and larger by removing all the side shoots, you will not be growing the plants as they would grow in nature. The majority of the *Echinocereus* group grow in large clusters and you should never try and keep this genus to single specimens. Many of the *Mammillarias* also make these groups naturally and some, such as the *elongatas* will start to send out side shoots when quite small seedlings. I remember trying to keep a *M. elongata* to a single stem over forty years ago, and, although I tried hard to get this plant to grow up nice and tall like the pictures I had seen of giant *Cereus*, I never succeeded in getting the plant over four inches high. Nowadays I like to let the plants grow naturally, although it means larger pots each year, with the inevitable crowding out of some unfortunate plant.

The *Echinopsis multiplex* which I mentioned as being in bud has flowered. My *Stapelia Pillansii* is still in flower nearly at the end of November, and it has scarcely been out of flower for many months. I find that the best way to grow *Stapelias* is to split them up every two years. The off shoots soon make fresh roots and the new plants seem to flower much better than the old plants if they are left to out-grow their pots, and I am sure that they remain much healthier.

continued at foot of p. 5

RAISING MESEMBRYANTHEMUMS FROM SEED

By H. JACOBSEN, of Kiel

The genus *Mesembryanthemum*, which is so rich in species, and was split up some years ago into a number of genera, belongs to the family *Aizoaceae*. According to a paper published by the Swiss Cactus Society in "Sukkulantenkunde I," June 1947, the new genera have been collected together into a separate family, the *Mesembryanthemaceae* Herre et Volk. Thus has been provided a good delimitation of this interesting group of forms. In the same journal, a new key to the family is published (by Dr. G. Schwantes) which, though not regarded as final, yet makes a further step forward towards a monograph.

Hardly any group of plants has so strongly attracted research workers and amateurs in recent decades as these mid-day bloomers. Imported plants have been sent in large quantities from their native land of South Africa to those countries where they are cultivated, especially to Europe and North America. But one must confess that the plants, after a certain time, collapse and die. These failures are often due to ignorance of the plants' mode of life. It is most important to see that these plants are given definite resting periods, i.e., times when they are dried, which vary in length and times of the year. To recognise and observe these periods is the great secret of cultivation. Watering at the wrong time makes success doubtful. The most valuable and rare plants are often lost in spite of good intentions and, perhaps, cannot be obtained again.

Since the propagation of imported plants by vegetative means is not always possible, and also only a limited number of new plants are available, the raising of plants from seed is well worth while. By breeding plants from seed new individual plants are raised which, for continued increase by seed, are not to be undervalued. It should not be overlooked that propagation by cuttings gives young plants which are individually part of the mother-plant. When one considers that *Mesembryanthemums* are self-sterile, and in many species strongly inclined to hybridisation, it is understandable that the pollinisation of flowers on individual plants from the same stock is useless or seeds, if produced, are, probably, the result of crossing with another species. Amateurs, and more especially professional growers, should endeavour to raise pure species only.

The provision of seed true to type is one of the most essential conditions for the raising of plants. Seeds which have been collected in the native habitat of the plants should always be preferred. These seeds are pure species since they have been produced under natural conditions. The percentage germination of such seeds is usually good. But it should be noted that freshly gathered seed does not germinate if sown at once; seed, in the fruits, must first be ripened off. Seeds of *Mesembryanthemums* should be at least one year old before they are sown. The viability of the seed lasts a very long time, one can keep the seed ten years and more and still get it to germinate. Even after twenty years some species are still capable of germination. It depends obviously on the way the seed has been stored. Seed, which is not sown at once, should be kept in the capsules since, in these, the seed is best protected from being dried up. Only in this way is long viability achieved.

The pollination of old plants in a collection is an important job that is especially worth while and there is every probability that seed will result. As already mentioned, great care must be taken when pollinating flowers to keep the species pure. It is very important to isolate the flowering plant from other species to prevent the transfer of foreign pollen by insects. The seed should be harvested when the capsules open themselves when wetted; often maturity is not attained until the next growing period, that is a whole year later!

The seed can be carefully removed from the fruit by breaking the parts of the capsule carefully apart and shaking the seed out. But since moistening the capsule causes it to open by itself, this method is advisable, for the seeds are less likely to be damaged. In nature, the seed is simply washed out of the capsule by the rain and distributed by the running water, or even, as has been observed, simply shaken out by falling rain drops.

The size of seeds is very different in different genera and even in species within a genus. Seeds of *Glottiphyllum* and *Pleiospilos* are conspicuously large and can easily be counted. Those of *Pleiospilos Hilmari*, on the contrary, are very much smaller than those of *Pleiospilos Bolusii* and *P. simulans*. The smallest are the seeds of the species of *Dinteranthus*, and *Lithops Vanzijlii* also has seeds almost as fine as dust, one capsule containing, often, many hundreds of them. Form and colour of the seed of different species are very distinct so that, after some experience, one can recognise the genus and, sometimes, even the species by means of the seeds.

(Translated by Mrs. V. Higgins)

ALOE SUCCOTRINA Lam.

By H. HALL

Shortly after my arrival in Kirstenbosch, I learned that a species of *Aloe* grew "wild" nearby. It is *Aloe succotrina*, derives its name, I believe, from the Island of Socotra, near the Gulf of Aden, many thousands of miles from its native home, the Cape Peninsula, and, even here, is confined to one or two areas only. It was one of the first *Aloes* to be mentioned and then, although largely cultivated in various parts of the world for its medicinal properties, became almost one of the "lost" species until its re-discovery more than one hundred years later. Of added interest to me, it is one of the species which flourished and flowered well each year in Manchester.

When I asked further about this species, a brown finger pointed vaguely towards the wooded slope behind Kirstenbosch, and, at the first opportunity, my young son and I set off in search. At about one thousand feet above sea level, we suddenly observed reddish flower spikes; *Aloes*! There they were, in scores, but the situation was not quite what I had pictured such things to grow in. This particular area is rather fantastic, perhaps an acre or so of enormous blocks of stone, tumbled down from Table Mountain in past ages, amongst which the *Aloes* seem to prefer to be for no traces of them could be found beyond it, where soil, etc. was more plentiful.

Several kinds of low trees and bushes shared this domain and thus supplied partial shade for the succulents. In between the stones, the *Aloes* grew, as if wedged there, preferring the more open spaces, if anything; and were of great age, judging from the length of the stems or trunks, and appeared to be deriving most of their sustenance from their own dead remains and traces of humus, far down between the stones, for I found little trace of soil. With age, they bend over, often hanging over the rocks and re-rooting where they recline, their old stems gradually becoming bare. The leaves are dull green, not heavily armed with prickles, and the unbranched flower spikes bear deep red flowers. At the time, it was the end of August, the rocks were quite moist, for it was not yet spring, and traces of moss and lichen were in evidence.

We searched for small specimens, but they were singularly absent. I was curious to know how young plants gain a foothold in such massive stones. In one patch of moss, a few inches in area, I found many seedlings showing a half inch of their first leaf. None of them could ever reach the nearest crevice where traces of humus might have sustained them. As summer approaches they will all die. In such surroundings the wastage of seed must be colossal.

More recently, I re-visited the area to look for ripe seed, but I found that insects had devoured a great many capsules. The plants looked quite contented, few people ever see them since they are rather off the beaten track, and, when I came away with a few amateurish photographs, the sun was almost vertical and uncomfortably warm. None of the plants will be for long in full sun because of the high rocks, the occasional bushes and the fact that the sun goes behind the mountain several hours before sundown.

CULTURAL NOTES (con. from p. 3)

If you are raising seedling Cacti be careful to see that the glass, with which you cover the seed pans to help germination, is raised a little as soon as the seedlings are up, otherwise they may damp off. Many members tell me that they get their seedlings up to a certain stage say up to the size of a pea, and then they stand still and make no more progress. When this happens the seedlings need a transplant, and if they are carefully removed from the pan and pricked out in small boxes they will usually soon start to grow again. Be careful though when you do this not to water them for at least a week, and then only with great care or you will lose them through damping off. There is no reason why young Cacti raised from seed should not be kept growing and they will soon make good plants under careful treatment. Remember that it is the attention to the smallest details that will ensure success. Many succulents are so easy to grow from seed that they are like weeds, even growing on the shingle on the staging where they have sown themselves. Some of the succulents which I have raised from the seed which was distributed in July have grown so quickly that I shall soon be crowded out of my greenhouse by them. *Glottiphyllum longum* has already taken possession of over half of the seed box in which it was pricked out and, in consequence, I am afraid that this will be one more to be relegated from the house.

Please remember that these notes are for your help and guidance and if there is any little problem that you have, just forward it to me and I will do my best. A Happy Growing Year to you.

A NEW VARIETY OF THE GENUS *ASTROLOBA*

By A. J. A. UITEWAAL

Astroloba egregia var *Fardeniana* Uitew. var. nov. differt ab *A. egregia* (Poeelln.) Uitew. folius in seriebus 5 distincte spiraliter dispositis.

Stem 10 cm. or more long, ca 5 cm. in diam. Leaves erect-spreading, somewhat overlapping, arranged in five distinct spiral rows, ca 25 mm. long and about 15 mm. broad, ovate-deltoid, a little curved inwards and sideways at the tip, ending in a small, sharp, brownish point, glaucous green, the face of the younger leaves concave, the older ones nearly flat, their backs rounded and with a distinctly marked, very oblique, keel forming the margin at the tip, with several somewhat darker, longitudinal lines, tubercled, these tubercles not numerous (two to about ten), dark green, shining, very seldom regularly arranged, but nevertheless always on the darker lines, margins and keel bordered with little, cartilaginous, rounded, shining teeth of the same colour as the tubercles but often with a brownish tip and mostly confluent at the tip of the leaves.

The type, *A. egregia*, and the above described variety are some of the most beautiful of this genus. Though it is well known to experts that with most of the species of *Astroloba* (and *Haworthia*), described as having the leaves exactly in straight rows, this characteristic is not constant. This variety is of so peculiar an appearance that its separation as a variety is justified. The above description I would complete by noting that, in considerable shade (under glass), the colour of the leaves changes to a somewhat olive green, they become somewhat longer (to 30 mm.), broader (18 mm.) and somewhat ovate-lanceolate.

I name this variety in honour of Mr. R. S. Farden who sent me the plant before the war when it was only a few centimetres high and just imported from South Africa. Mr. Farden, with whom I corresponded for several years, was a keen collector and student of this and allied genera. It is a great pity that his advancing age forced him to give up his beloved hobby. He presented his plants to Kew and the drawings and descriptions that he made from the plants in his collection to the Library of the Royal Horticultural Society.

Here may be the right place to account for the generic name *Astroloba* which is, probably, unknown to most readers. As stated earlier (see Vol. 9 : 52-54), the genera *Haworthia* Duval (1809) and *Apicra* Willdenow (1811), are based on the same characteristics and are, therefore, synonyms, the last of which must be discarded. The name *Apicra*, as used later by Haworth for plants with a regular limb (not bilabiate as in *Haworthia*), must be rejected because it is a later homonym of *Apicra* Willdenow. Previously, I supported a proposal for conservation of the name *Apicra* Haw. However, this would necessitate a considerable number of changes in author's names. Such changes could be avoided by conservation of the name *Apicra* Willd., sensu Haworth, but if this course were adopted, the result would be unsatisfactory and confusing because of the existence of two different genera, closely related, called *Apicra*. Moreover, when conserving either of the names *Apicra*, the well known specific epithet *spiralis* would become untenable, whereas in conjunction with a new generic name it would have a meaning free from misunderstanding.

As the question relates to a small genus of little or no horticultural importance, it was thought the best plan would be to rename it, a procedure fully justified and in accordance with the Rules. This is also the opinion of Dr. J. Lanjouw of the Botanic Institute at Utrecht, who is an expert on such questions.

In "Succulenta," 1947 : 53, I gave the genus its new name *Astroloba* (astron—star ; lobos—lobe).

NOTES

By A. J. A. UITEWAAL

Typical flowers of the genus Astroloba

The genera of the subtribe *Aloinae* are principally based on the outward structure of the flowers (see Vol. 9 ; 54). *Haworthia* and *Astroloba* (formerly *Apicra*) seem to be very nearly related genera ; the flowers of the first have two-lipped, rather distinct zygomorph limb, the free segments are rather long ; the flowers of *Astroloba* have a regular limb, the free segments much shorter than those of the former. Though the flower segments of *Astroloba* are not always so regularly, stellarly arranged as the name suggests, it is nevertheless a good characteristic to separate it from *Haworthia*.

Astroloba pentagona var *spiralis* (Haw.) Uitew.

This is a robust form of *A. pentagona*, with about 5 cm. long and 2 cm. wide, nearly overlapping, lanceolate-acuminate leaves, which are arranged in five conspicuous, spiralled rows. Their face is flat and smooth, their backs convex, keeled and furnished with several scattered, somewhat raised, little points, the margins and keel minutely

Haworth, who described this form as *Aloe spiralis*, considered this to be the same as had been described by Linnaeus under this name, but which, however, has spongy, rough flowers. Salm Dyck, correctly, regarded it as a simple robust form of *pentagona*; the form of the leaves, as well as the smooth flowers, resemble those of the latter.

The type species, *A. pentagona* (Haw.) Uitew. has its leaves arranged in five straight, or scarcely spiralled, rows. As stated by Haworth himself "for twenty-five years this plant with me has never become spiral, but constantly produced its imbricated leaves in five rows."

There are two other forms, i.e., var. *spirella*, a form with leaves about one inch long in very spiralled rows and, therefore, seemingly multifarious, and another form, var. *torulosa*, which is very near to the latter, but of which the leaves are much less multifariously arranged, so that the five rows are very distinct. The flowers of both these varieties are indistinctly spongy, but not rugose or crenate as those of the true *spiralis* of Linnaeus. The var. *torulosa* has been regarded by Schultes (in Kunth Enum) as a separate species, but it may, perhaps, be no more than a somewhat differing form of the var. *spirella*.

Greenovia aurea.

This easily grown and soon clustering species is the best known of this little genus, endemic to the Canary Islands. They are very much like the *Aeoniums*, but are short stemmed. *G. aurea* makes beautiful little, glaucous green rosettes, of which the form during the resting period (summer!) much resembles roses about to open. When flowering, the forked branched peduncle is closely beset with leaves and crowned with showy, gold yellow flowers (hence its name).

This species likes plenty of water in the late summer, but very little water and a cool temperature in winter.

It belongs to the family *Crassulaceae*, subfam. *Sempervivoideae*, which includes the species generally called the Canarian *Sempervivums*. The true, hardy *Sempervivums*, well known from the Alps of Europe, are, however, stemless. On the Canary Islands the more tender genera *Aeonium*, *Aichryson*, *Greenovia* and *Monanthes* are represented, of whom the first is the best known, the others seldom occur in our collection; they have rather long pedicelled flowers.

The genus has been named in honour of G. B. Greenough (1778-1855), an English geologist.

Gasteria caespitosa Poelln.

This little stemless *Gasteria*, described by Dr. Karl von Poellnitz in *Kakteenkunde* (1937) 165, soon makes a dense cluster (hence its name).

The leaves are erect in youth and spreading in age and are arranged exactly in two opposite rows; old plants may become somewhat spiral and stemmed. The leaves are 10-14 cm. long, 2 cm. wide at the base, gradually narrowing and ending in a deltoid-acuminate tip with a distinct mucro, on both sides slightly convex, but flat at the tip; the margins are smooth, but tubercularly roughened above, the apex is edged with a narrow, smooth or slightly roughened, horny line. The rather dark green, glossy leaves are distinctly spotted with ca. 2-4 mm. long and wide, or oblong spots of greenish white (or better light green) which are mostly $\pm$ united; those on the back are more numerous.

The flower stems, simple or forked, bear typical *Gasteria* flowers, the oblong-roundish swollen base reddish coloured, the shorter tube-like part with green stripes.

This is a very attractive, neat species, producing an abundance of offsets and is (as most *Gasterias*) easy to cultivate. It has been collected by Mrs. van der Bijl at Somerset East and introduced since about 1930.

Toumeyia papyracantha (Eng.) B. & R.

This species was first described by Engelmann as a *Mammillaria*. In 1849, Fendler found one specimen and another in 1873 and 1897 in the vicinity of Sante Fe (New Mexico). In the same year it was also found by Mrs. Dale Bumstead in the vicinity of Showlow (Navajo County, Arizona). Mr. J. D. Whiteman re-discovered it in 1935 and following this more specimens have been found. A detailed report of the re-discovery in 1935 was published in the *American Journal* Vol. 7 (1936) 131. The greatest ornament are the central spines, generally three, twisted or even curled, of which two are antler-like, curved upwards, the other one stretched forwards and curved down; they are flat, papery, non-pungent. The widest one, which is curved downwards, is about 2-3 mm. wide, the others half as wide and all are no thicker than writing paper; their colour changes from pale grey to reddish-brown fading to light tan in young plants (grooved spines may be peculiar to Arizona specimens). The flowers are whitish to pinkish, about 2½ cm. high.

The grafted plant, shown in the photograph, flowered this year with six flowers one opening after the other all from young tubercles, the colour dirty white. The colour of the spines in our cultivated plants one could indicate as strawish-yellow. Grafted, it is a very easy growing and flowering plant, hardy, and for its beautiful spines, too, a very worthy addition to our collections.

EXTRACTS FROM LETTERS

Miss M. C. Karsten.

On excursions in the neighbourhood of Grahamstown—several times I was taken out by car to see something of the country and get acquainted with the vegetation—I came across *Euphorbia pugniformis* Boiss and *E. gorgonis* Berger which certainly belong to the most peculiar forms within this genus. The mode of growth is very interesting, they grow embedded in the hard, stony soil nearly to their truncate top with the wartlike protuberances (podariums). I found specimens completely flat with the surface by means of which they easily escape notice, especially when growing at the foot of one of those small Karoo shrubs. You may walk over a *pugniformis* without being aware of it! Without a proper tool—a small pick-axe would be the best thing to use—it is practically impossible to dig out these *Euphorbias* without damaging them. They have a long taproot which, when using a knife to get the plant out of the ground, will easily be cut off. On Karooland, an odd ten miles from Grahamstown, I found *Euphorbia meloformis* Ait. in its habitat, and also this species grows for the greater part sunk into the ground, though not to the extent as shown by the other species, as far as I could see.

A little "kloof," in the close vicinity of Grahamstown, I found abounding with succulents of every description! *Aloes*, *Haworthias*, (*H. Reinwardtii*, Haw.), *Euphorbias*, *Crassulas* in many species, *Cotyledons*, shrubby *Mesembryae*, etc. It was just like a succulent rockery, this western slope of Gowie's Kloof!

H. Hall.

(Referring to Mr. Pullen's lecture). All *Agaves* do not die after flowering, several live on, e.g., *A. attenuata*, and others. *Gasterias* do not "develop leaves in pairs" and most of them become spiral with age. Only one plant, of great age, never changed the distichous habit with me, *G. sulcata*. Nor do I know of any *Cotyledon* species which dies after flowering. What is *C. gesticulatum*—*reticulata*, I expect. "*C. reticulata* comes from the African rainbelt," that will mislead many and puzzle my friend, Mr. Herre! I have seen them in hundreds recently, round Matjesfontein district, where the rainfall is six inches per annum. They are typical Karoo types and grow in association with *C. Wallichii*, *Crassulas* and the shrubby, twiggy *Mesembs*, and thin, non-succulent bushes. True, the rain falls in winter, but six inches only.

I find the work at Kirstenbosch to be just what my mental pictures were—a paradise of botanical things, and to me, succulent plants mainly. It is beautifully situated on the eastern slopes of Table Mountain, has quite a high rainfall compared to places even a few miles away, and some of the succulents, allergic to winter rains, have to be kept under glass in the cooler, wetter months.

Already I have seen many species truly wild up on the Karoo. *Cotyledon Wallichii*, for instance, a rare species in cultivation, occurs in hundreds of thousands near Matjesfontein. I have also experienced the vision of the surrounding hills, near Worcester, tinted pinkish mauve with *Mesembryanthemums*.

Mrs. M. G. Mikelson (to Mr. Boarder).

Last spring, Mrs. Bullington and I went on a ten day collecting trip in New Mexico and Texas along the Rio Grande River which separates New Mexico from Texas.

It is a three day trip from El Paso to Edinburg where we went to see the Pirtle Garden. The two Pirtle sons and their eighty year old mother care for this five acre place, with one Mexican helper. This valley of the Rio Grande is tropical country and how the cactus grow with a little water and attention! Great huge specimens that you had to look up to see their tops, and *Astrophytums* in great long rows, watered like so many cabbages, and growing like weeds. Great big golden *Grusonis* glistening in the sunshine, and *Giganteas* happy as their companions. The Pirtles have a very small glasshouse, everything is outside in the sunshine. Their *Haworthias*, of course, were under glass and in lath houses.

After a day in the Pirtle Garden, we started back to Deming, New Mexico, collecting all the way. This is a cactus country and we found different species along the way each mile we drove. The cactus grow everywhere here, *Opuntias*, *texensis* in the pastures, *Echinocereus* on the hillsides. In some areas rain is scarce, and the plants just go into a state of rest and wait for a little moisture to fatten them a little and bring them into bloom.

Just past Laredo, we collected *Lophophora Williamsii* hidden under mesquite bushes in the clayey silt of the river bed. Here also we found *Echinocereus Fitchii* and *pentalophus* at its best. They were blooming, and *Fitchii* has a flower larger than its own plant body.

A half mile further on, we saw a different soil formation and here we found beautiful plants of *Coryphantha neo-mexicana* and *vivipara*; also *C. Runyonii* and *macromeris*. Travelling a few miles further on we explored a hillside thick with mesquite bush facing south. Here we found *Thelocactus bicolor* hidden among the brush, in

a gravelly, very dry soil. A mile or so further on, we took a rough road and went about five miles off the beaten path and then explored for plants. Here, in a flat silt bed, we found *Ancistrocactus Scheerii*. They have a thick root reminding one of a white ribbon. Their spine formation is so wonderful and hides the plant body completely. The flowers have a hard time to poke through and many plants hold the seed pods on for a couple of years.

In a pasture, green with grass, near Eagle Pass, we could see *Homalocephala texensis* in bloom. It was quite evident rain had fallen here during the winter as the grass was green. We crawled under the bob-wire fence and dug some perfect specimens and also found a small *Coryphantha* which, I think, is *sulcata*.

Near Del Rio, along the roadside, we found clumps of *Ferocactus hamatacanthus*, and, under the brush, some *Neom. hemisphaerica*. They also had had some water during this winter.

We stopped at Marathon, Texas, while we explored the Big Bend district which is one of nature's over planted cactus beds. We rested a half day and then took the road due south toward Mexico. Mr. A. R. Davis, who is plant inspector here, told us to go down about thirty miles and we would find *Ariocarpus fissuratus* in the limestone beds there. This we did and what a thrill to see these "living rocks" pulled into the earth so that they were completely flat and any animal stepping on them would do no injury! It took a man with a pinch bar to collect here. We got some nice specimens, some with double heads and some with seed.

On the way back to Marathon, we collected on the hills and also in the flat pasture. We found some *M. meiacanthas* and *applanatus* well hidden under bushes and they looked green and fat for having so little rain as they do in this area. Here also was *Escobaria Runyonii* and *dasyacantha* and we also found some nice specimens of *Escobaria tuberculosa* which does so well in cultivation. We gathered a few *Ferocactus uncinatus*. All along these twenty five miles into the Big Bend we constantly saw *Fendleris*, *viridiflorus* and *chloranthus*. High up on the rocky hills we could see great clumps of *stramineus* as large as wash tubs, and there were a few plants of *Echinocactus horizontalis*.

We concluded the Texas part of our collecting trip and headed back to Deming, New Mexico. When we were sufficiently rested we made another trip in the area between Deming and the Mexican line. Here is where *Ferocactus Wislizenii* and *Coryphanthas* grow to perfection. The rolling pasture land and the rainfall are just right. *Neo-mexicanas* also like this location.

There are many varieties of *Opuntias* in this territory and when they are in bloom in August they are most beautiful. Texas also has many varieties of *Opuntias*.

Another day we made the trip to the White Sands Monument and Alamogordo in New Mexico. Near White Sands we saw large clumps of *Echinocereus triglochidiatus* and *rosei* and up on the sloping terrain near the town of Alamogordo there were several different *Echinocereus* and *horizontalis* at their best. An occasional freshet of rain falls on this mountainside and runs off quickly. The plants are in a very gravelly soil protected by mesquite bushes again which adds to their perfection.

MESEMBRYANTHEMUMS (con. from p. 17)

In the following list I have attempted to place some of the species in their respective groups so that the resting and growing period of those included can be readily ascertained.

GROUP I—From Little Namaqualand, Karoo—Growing period in Summer; resting period November to April :—*Argyroderma*, *Bergeranthus*, *Rhombophyllum*, *Carruanthus*, *Cheiridopsis*, *Dinteranthus*, *Fenestraria*, *Lithops*, *Schwantesia*, *Titanopsis*.

GROUP II—From Great and Little Namaqualand—Growing period August to October; resting period April to July :—*Conophytum*, *Frithia*, *Faucaria*, *Juttadinteria*, *Pleiospilos*.

GROUP III—From Little Karoo—Growing period Autumn to Spring; resting period July to September :—*Gibbaeum*, *Glottiphyllum*, *Ophthalmophyllum*, *Imitaria*.

GROUP IV—From S.W. Africa—Growing period Spring and early Summer; resting period November to March :—*Hereoa*, *Rimaria*, *Trichodiadema*.

SHRUBBY TYPES suitable as edging plants to the above :—*Delosperma echinatum*, *Brunnthaleri*, *Drosanthemum oscularia*, *deltoides*, *Aptenia cordifolia*, *variegata*.

Saguaroland Bulletin, a new publication of the Arizona Cactus and Native Flora Society, sponsoring the Desert Botanical Gardens in Papago Park, Phoenix, Arizona, of which our good friend Mr. W. Taylor Marshall is Director, is extremely interesting. At present it is mimeographed, but full of many things worth reading and Reg Manning's cartoons are, as usual, funny and helpful. Mr. J. T. McChesney, Route 7, Box 1172, Phoenix, Arizona, is the Editor, but may we remind him that our Society is hardly a post-war mushroom growth, having been established in 1931? It is hoped, by the Bulletin, to increase the interest in, and the financial aid of, the Gardens.

HAWORTHIA NOTES

J. R. BROWN

Some of the Haworthias of the sect. *Trifariae* Haw. might be called the aristocrats of the genus, as the appearance of mature plants of *H. viscosa* and some of its forms is one of exceeding elegance, and a very long span of time has passed in their development.

The Haworthias of this sect. have elongated, leafy stems, the leafy stems usually more or less triangularly prism-like ; leaves usually crowded and overlapping, in straight or more or less twisted rows, leathery appearing and fleshy, dark to light green in colour, or brownish in the sun, more or less minutely scabrous or rugose, or, in the case of *H. Schmidtiana* and its forms, with a distinct pattern of raised, concolorous, tubercle-like markings.

One or another of the forms of *H. viscosa* are probably the best known plants of this sect., and the innumerable forms of this one species would alone constitute a large and most interesting group for study, varying as they do from plants with leafy stems scarcely 15 mm. in diameter to those of 70 mm., some with the leaves in straight ranks to others with the leaves in more or less spiralling ranks, which may twist to the right or to the left, or sometimes one plant may have stems some of which may spiral in one direction and some spiral in the opposite ; an infinite degree of variation occurs in this species, increasing the interest of the grower.

H. viscosa and its forms branch more or less slowly from the base, and in some cases a lifetime may pass before a large cluster is grown from one small stem, as the yearly increase in the length of a stem of certain forms may only be about 1 cm. and one can marvel upon seeing a very old cluster for the first time.

H. viscosa var. *caespitosa* is a faster growing form, which makes a dense, low, spreading cluster of stems, differing somewhat in habit from other forms. *H. viscosa* var. *indurata*, var. *concinna*, var. *pseudotortuosa*, and var. *torquata* are varieties which are long known and more or less familiar to those interested in Haworthias.

H. asperiuscula and its forms resemble the forms of *H. viscosa* very closely, having somewhat more scabrous leaves, but forms occur which would seem to show a merging of the two species.

H. Schmidtiana and its many forms are quite distinct from the other members of the sect., being plants of lower stature, with a very distinct and unique pattern of tubercles on the leaves, especially on the back of the leaves ; this is well shown in the photo of one of its forms. This pattern stands out very distinctly on plants growing in their natural abode, as the leaves seem to be more or less sticky when young, causing the dust of their surroundings to adhere and coating the plants. When brought into cultivation this film of dust is gradually lost and the tubercles become more or less shining. Most of the forms of *H. Schmidtiana* produce plantlets from underground stolons in much the same manner as the more familiar *H. tessellata*.

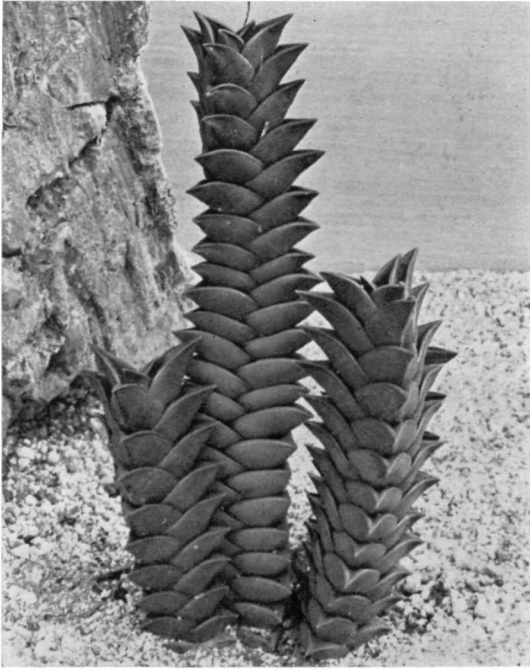
Numerous forms of *H. Schmidtiana* are known, among them, var. *angustata* with narrow leaves, var. *suberecta* with more erect leaves, and var. *elongata* with leaves more widely spaced.

Stickiness or viscosity is not very evident on many of the forms of *H. viscosa* and where present seems to be confined to the young growth, as in the case of *H. Schmidtiana*.

Plants of *H. viscosa* and *H. asperiuscula* being of such very slow growth, it would appear that great care should be exercised in their preservation, as old plants are almost irreplaceable. The drainage of the soil should be given most careful attention and the watering very carefully done, especially during the cold and dull period of the year ; and to retain the compact growth which is one of their greatest charms they should be given as airy and sunny a position as possible in the greenhouse.

The Haworthias of the sect. *Trifariae* Haw. shown in the accompanying photos are *H. viscosa* (L.) Haw., the tallest stem of this plant was 13 cm. in length ; *H. viscosa* var. *caespitosa* Poelln., this cluster was 11 cm. in diameter ; *H. asperiuscula* var. *patagiata* G. G. Smith, this stem was 9.5 cm. in length ; *H. Schmidtiana* var. *diversifolia* Poelln., this plant was 7.5 cm. in height. The plants illustrated have short leaves and thus show compact leafy stems ; however, there are numerous forms which have longer leaves arranged in a more open and looser manner on the stems.

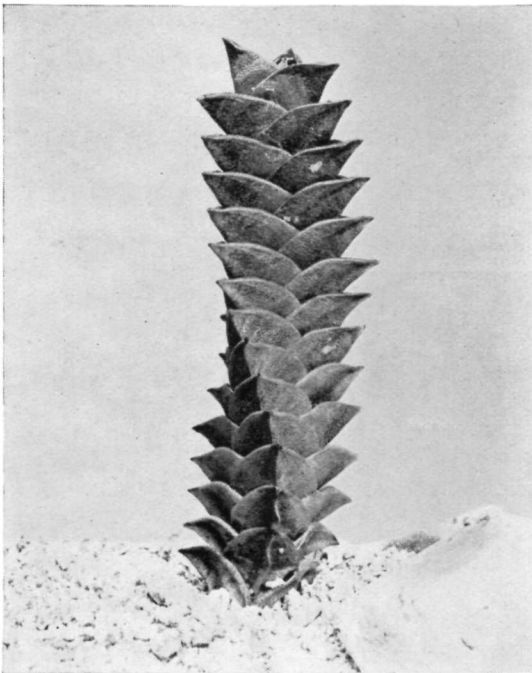
In addition to the dates given on the Society Page, meetings, etc., have been fixed up during 1948 as follows :- May 4th, June 8th (Show), July 6th, August 10th, September 7th, October 5th (Show), November 2nd and 30th.



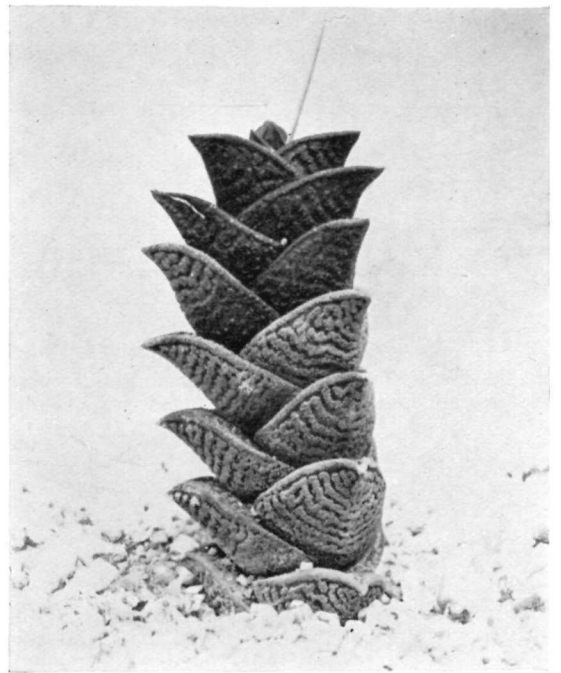
Haworthia viscosa (L.) Haw.



Haworthia viscosa var. *caespitosa* Poelln



Haworthia asperiuscula var. *patagiata* G. G. Smith



Haworthia Schmidtiana var. *diversifolia* Poelln



Gibbaeum Comptonii L. Bol.

H. Jacobsen



Aloe succotrina

H. Hall



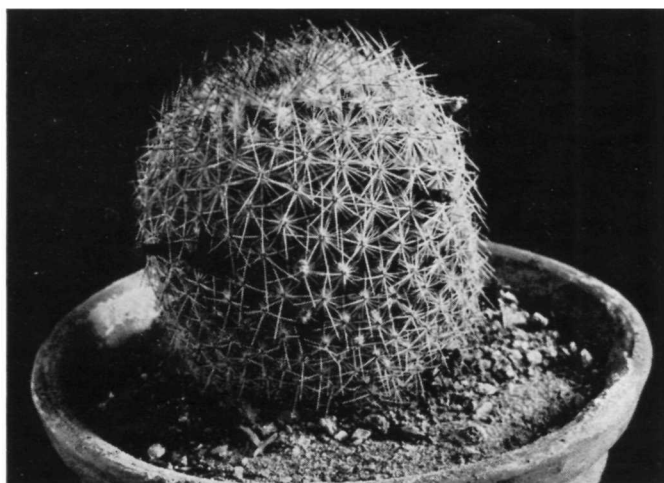
Titanopsis primosii L. Bol.

H. Jacobsen

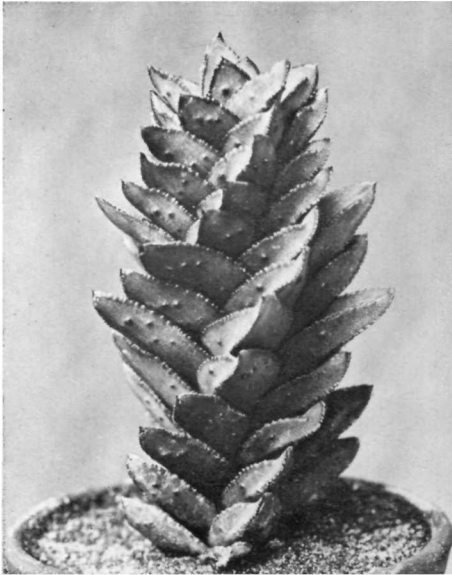


Norrköping

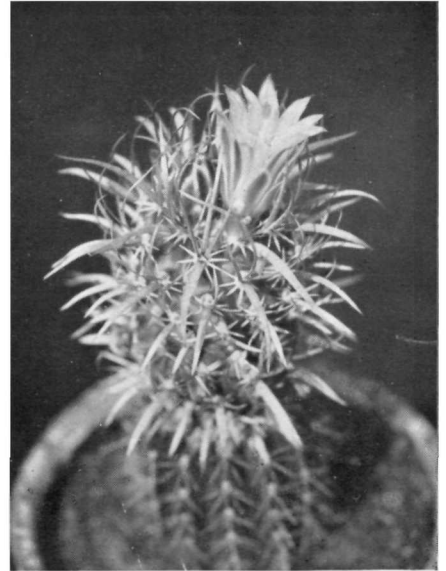
Captain H. J. Dunne Cooke



Mammillaria Mollendorffiana Shurly



Astroloba egregia fardeniana Uitew A. J. A. Uitewaal



Poumeya papyracantha (Eng.) B. & R. A. J. A. Uitewaal

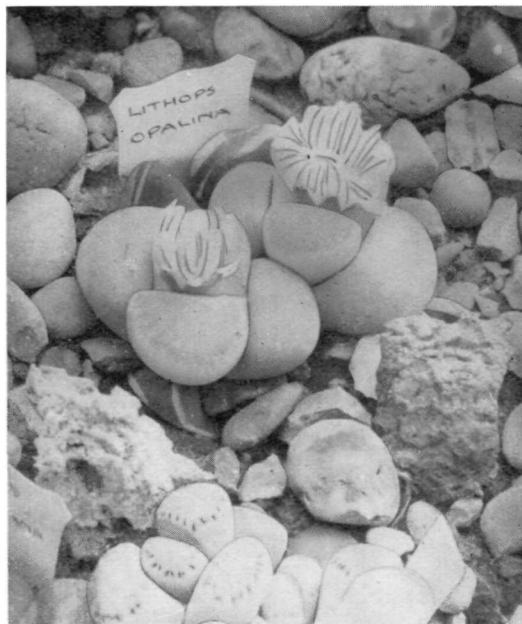


Pseudorhipsalis macrantha

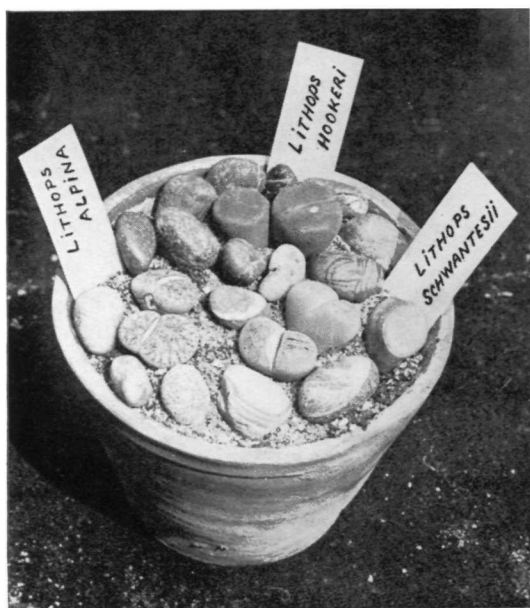
W. Taylor Marshall



Lithops during Growing Season



Lithops opalina



2-year *Lithop* Seedlings



Conophytum frutescens

The above four photographs by G. G. Green

THE CORYPHANTHAE MAMILLOPSIS AND COCHEMIEA

By W. TAYLOR MARSHALL

Two genera in the *Coryphanthae* bear long, tubular flowers in shades of red. They comprise the aristocrats of the tribe because of their large and showy flowers, but they have artistic temperaments and thrive only under conditions of their own choosing, therefore, are not commonly seen in collections.

Mamillopsis is a genus of two plants from the high mountains of central Mexico which are globular to short cylindrical in shape, completely hidden by the long, white, hair-like spines which are borne on the areoles at the apex of the tubercles. In age the plants form large clumps. The long-tubed, symmetrical, red flowers arise from the axils of the tubercles near the top of the plants.

Mamillopsis senilis (Loddiges) Weber is distinguished from *M. Diguetii* (Weber) B. & R. by its softer spines and orange-coloured flowers while the latter species has straw-coloured, more robust spines and deep red flowers.

The genus *Cochemia* was erected by Walton in *Cactus Journal*, London, in 1899, and is strictly confined to Baja California, and the islands off its coast. It differs from all the other genera in the tribe in the long, cylindrical stems of the dense clusters of all the species and in the asymmetrical flower which is tubular with coloured sepals, very short and erect outer petals, which are only half as long as the inner ones and recurve about half way up the limb. The inner petals are of unequal length, the upper ones longer than the lower ones but all recurved. The pistil is exerted nearly as far as the limb length and the stamens also project above the mouth of the flower. All the flowers are red.

Cochemia Halei (Brandege) Walton, the type species, forms clumps of long, cylindrical stems which bear brownish spines so dense as to hide the stem completely. It is indigenous to Magdalena and Marguerita Islands off the west coast of Baja California and, while it does not take kindly to cultivation usually, it is at home and grows well at the Desert Botanical Garden.

C. Poselgeri forms clumps of long, cylindrical stems and prefers to grow on cliffs with the long stems pendent. It bears about 10 spines from each tubercle so the plant body is clearly visible. One central spine from each tubercle is hooked. It is native to the southern end of the peninsula of Baja California, where it is one of the most showy plants of the region.

C. setispina (Coulter) Walton forms very large mounds of its cylindrical heads which are completely hidden by the numerous white spines which attain a maximum length of 34 cm. One of the central spines is longer than the others and is strongly hooked. This species is found at San Borjas, in the mountains on the eastern side of the peninsula.

C. Pondii (Green) Walton has been collected only from Cedros Island off the west coast of the peninsula, but could be expected on the adjacent mainland. It resembles *C. setispina* in general appearance, but is usually smaller both in the size of the stems and of the mounds of stems.

C. maritima Lindsay is a recently discovered species from the west coast of the peninsula about midway between the locations of *C. Pondii* and *C. Halei*, always within sight of the sea. It somewhat resembles *C. Halei*, but it has darker, reddish-brown spines, one of the centrals hooked.

All the *Cochemias* are of rather corky texture and only *C. Poselgeri* does well in cultivation generally. The beauty of the flowers make them desirable and, doubtless, a method of growing them for collections will be found.

PSEUDORHIPSALIS MACRANTHA Alexander, *Cact. & Succ. Journ* XIV : 19. 1942. Mr. T. MacDougall has collected many new and interesting plants from southern Mexico, not the least of which is the new species recorded in the *Cactus and Succulent Journal* in February, 1942. Mr. E. J. Alexander, who described the new species, called attention to the fact that it upset some preconceived ideas in that the flower was larger than is usual in the genus. His description was as follows :—

Plant epiphytic, the stems and branches phylloid, bright green, terete at base, arching or pendent, up to 90 cm. long, 4.5 cm. wide, tapering apically ; areoles minutely gray—felted ; flowers 7.5 cm. across ; ovary 4 to 5 mm. long, green, with 6 deltoid, brownish-purple scales ; tube 2.5 cm. long, flushed rosy-purple over greenish-orange, naked or with 1 or 2 tiny scales ; perianth segments 9 to 13, spreading, linear, 3.5 cm. long cucullate at apex, the three outer ones light brown-orange, rosy purple at base, the remaining ones bright lemon-yellow ; stamens numerous, somewhat decurved, the filaments white ; anthers and pollen cream coloured ; style and stigma cream coloured, stigmas 5, spreading, lance-linear, strongly papillose ; fruit red, globular.

Type collected north of Niltpec, on the north side of the main Sierra near La Gloria at 2,500 feet altitude in rain forest, Oaxaca, Mexico.

THE MESEMBRYANTHEMUMS

By G. G. GREEN

The article by O. Hoebel in the last issue of the Journal on the "Separation of *Lithops* species" prompts me at this juncture to include my own observations on this and other species in the vast genera of *Mesembryanthemum*. It must be admitted, I think, that this family of succulents has the biggest appeal to most collectors, being of such a wide and various nature with so many attractive and interesting species.

Most people are familiar with the shrubby types of *Mesembryanthemum* that provide such dazzling displays of colour on the rockery or border during the summer months and which are ever popular at the seaside resorts, where they seem to grow extraordinarily well, as well as with the "ice plants" (*Mes-criniflorum*) of riotous and wondrous colouring, that can be sown easily among other plants on the sunny borders and dry positions on the scree garden.

It is truly amazing to think that these and the *Lithops*, *Conophytums*, etc., are related and spring from the same family tree, yet in their native South Africa, before the depredations of collectors and settlers had reduced their numbers, the same blaze of colour and glory was evident amongst these more aristocratic members. It is extremely disquieting to hear of the great drought that has devastated such large areas of *Lithops*, etc., this year in South Africa, and one hopes that wholesale replanting and culture of the species will be possible in the near future.

The shrubby types are very effective when grown on the edges of staging or in indoor rockeries and soon provide an attractive display of colour and foliage as a border to the general collection. The *Drosanthemums*, with their glistening foliage and pretty flowers, are especially recommended as they grow very quickly and soon reach the floor of the house from the staging, where they take root through the drainage hole and in the gravel or sand or whatever is used and require no more attention whatsoever. *Corpuscularia Lehmanni*, *Mes. Brownii*, *Oscularia deltoides*, *Mes. roseum*, provide good contrasts in colour of flowers and in leaf structure, growing bushy and flowering for long periods.

The more succulent types, including such species as *Lithops*, *Conophytum*, *Gibbaeum*, *Pleiospilos*, *Schwantesia*, *Titanopsis*, *Juttadinteria*, *Lapidaria*, *Fenestraria*, *Faucaria* and *Stomatium*, are by far the most interesting plants to grow and are fairly easy to cultivate if one or two simple rules applicable to the various species are observed.

As is commonly known, these plants originate from South Africa, but are so widely spread over great distances that natural conditions vary considerably with consequent variation in rainfall, temperature and soil conditions. Such variations must be considered by the collector when growing these plants if they are to be grown correctly, by which I mean, if they are to retain all their natural characteristics of colouring, shape and resting periods.

There is no doubt that, in time, most species will adapt themselves to conditions prevailing in the particular greenhouse containing them. They will grow fairly well and flower each year but, unless particular attention has been paid to the cultivation peculiar to each species, it is certain that many natural characteristics will be lost and the specimens will be totally different from the same species growing in their natural habitat.

Such cultivation, whilst being successful as far as abstract growing is concerned, is to be deplored as not worthy of the true collector who should strive as far as possible to retain all the natural characteristics of his plants, unless special improvements upon nature are obtained otherwise.

This does not mean that the whole procedure is difficult, tedious or impossible by the ordinary amateur—on the contrary, it is fairly easy if one knows the district of the plant's natural home or if one cares to ask for or look up the species' requirements in a book of these plants.

For the purposes of this article, and for the benefit of the small collector who has room for only a hundred or so of these plants, I have divided into classes those species which can be grouped together to receive identical treatment. The collection is, as should be realised, only my own selection from this enormous family, and many species will have been left out, not because I do not think they are any the less interesting or important, but because it would be fatuous to attempt to include anything more than a small proportion in such a writing. There are good books on the subject, as well as previous articles in the Journal, which will provide names of other species well worth growing.

I have found, after many years of experiment and study, that the most satisfactory way of growing *Mesembryanthema* is to sink the pots up to the brim in a mixture of equal parts sand, gravel and leafmould on staging that can retain any moisture for a considerable time.

If weathered stones are placed at strategic positions the whole effect is remarkably true to life and the watering problem is distinctly simplified, especially if the different species are grouped together in their respective classes.

It then becomes necessary only to water the surrounding gravel mixture, as enough moisture will percolate through the drainage hole and sides of the pots, and roots will be encouraged to strengthen and search for their own moisture from below. The position chosen should be the brightest in the house as, in my opinion, no sunlight that England has to offer can compare in brilliance with the kind experienced in South Africa. I have never had occasion to shade the glass over these succulents and contend that sunshine, unadulterated, is essential for the natural cultivation of the species.

When the resting period of each group arrives, watering can be withheld entirely and a gradual drying out of the pots will ensue, which is as near to natural conditions as is possible. During the growing period, watering can be carried out fairly freely, if only the surrounding mixture is watered as stated above, and should be commenced gradually a week or so before the allotted time. I have been repeatedly asked how one is to know when the growing and resting periods begin or end, and can offer a good general rule that I follow myself.

In the first place, notes should be taken of the habits of mature plants :—when flowers appear, seed pods set, etc., denoting the ending of the growing period ; when the plants begin to split in the case of *Lithops*, *Gibbaeum*, *Pleiospilos*, *Conophytum*, etc., or when new leaves begin to appear in others denoting the commencement of the growing period, the time between being the resting stage. The length of each period together with the dates should be carefully noted and written down on a label placed in each group position so that such information is immediately to hand.

In this way, no confusion arises as to which has to be watered and which has not. Of course, not everyone has a mature plant to observe, but a glance at the groups classified below will probably help to banish any doubt.

Propagation of the more succulent species, such as *Lithops*, *Conophytum*, *Pleiospilos*, etc., is generally by seed, but cuttings of each can be taken where it is important that the resulting plant should be true to name. The *Conophyta* can be split up by dividing the plant groups so that each division has part of the original stem attached or roots of its own. *Lithops*, *Gibbaeum*, *Juttadinteria*, etc., are harder to divide as they are not so prolific as the *Conophyta* in multiplying, and it is important that all cuttings should be complete plants in themselves and not consist of slices of leaves which would be absolutely useless.

In all cases, it is best to take cuttings about a month before the growing season commences, allowing each to dry at the severed portion before inserting in a sandy mixture of leafmould and peat. Where any old skin adheres to the stem, this should be removed before inserting the cuttings in order to avoid rotting.

Water should be withheld until signs of growth are discerned on the original plants when the cuttings can be encouraged to root by spraying the mixture gently with water.

As for seed raising, a compost of equal parts, finely sieved, peat, old loam and sand placed to a depth of an inch over the courser riddings, which should fill at least two-thirds of the seed pan, is satisfactory. Seed should be sown before the growing season commences, but as some heat is required, this is very rarely done in late autumn or winter, April being generally the best time to sow. I believe in the rapid germination of the seed so that watering can be withheld as soon as possible to a minimum. Seedlings have a nasty habit of damping off although the best precautions may have been taken, such as using Chestnut compound, charcoal, etc. If the seeds are made to germinate quickly, the surface of the soil can then be kept fairly dry by careful immersion of the pans when watering and harder growth thus encouraged of the seedlings.

Pricking off should be commenced as soon as the plants are about $\frac{1}{8}$ " high in order to prevent squeezing (another cause of rotting) and to encourage fibrous roots instead of the long, slender tap root that these seedlings are content with. If, however, the resting period for the particular species has arrived pricking off should be delayed.

Watering before being pricked off should be regulated by the growth of mature plants and, when the resting period comes along, a minimum of water should be given. The tender seedlings should be protected from direct sunshine until their size has increased to a $\frac{1}{4}$ " when they can be treated in the same way as mature plants.

A good general mixture for most of the *Mesembryanthemums* is as follows—2 pts. each of coarse sand, leaf mould, fibrous loam, 1 pt. each broken charcoal and old mortar rubble broken fine, with the addition of $\frac{1}{2}$ pt. old cow manure. Such species as *Titanopsis*, *Schwantesia*, etc., like a little more calcareous substance in the mixture such as the addition of 1 pt. broken limestone chippings or oyster shells, etc. The cow manure is not absolutely essential but strong growing species such as *Pleiospilos* like the extra encouragement. When potting allow plenty of drainage by using the coarser riddings of the compost to about half the depth of the pot.

NOTES

During 1947, I received from Mr. F. Schwarz, of San Luis Potosi, Mexico, a new *Mammillaria* which is especially attractive. This is not an official description because that privilege belongs to Mr. Krainz, of Zurich who, undoubtedly, awaits flower and fruit, but it is so exceptional that readers may like some sort of description now.

Mammillaria pennispinosa. Tap root shaped like a molar tooth. The stem is 15 mm. high with a 30 mm. brown underbody (not including root), 35 mm. wide, all include spines, rather flattened globose (wider than high). Simple, as far as is known, apex barely depressed. Tubercles cylindrical, tapering gently to a flat apex which slopes slightly downwards, heavily and conspicuously covered with minute dots of white hairs, 6—7 mm. long, $2\frac{1}{2}$ —3 mm. wide at base, watery, in 8 x 13 spiral rows. Areoles slight around the growing point only, short, but dense pinky cream mat, under spines and only discovered with difficulty. Axils, the shortest and smallest tuft of white wool, in age usually bare. Radials, 16, dull white with reddish brown tip, thin acicular, straight, abundantly white hairy (plumose), 5 mm. long, in youth radiate regularly above horizontal, but horizontal in age, minute yellow brown thickening, not bulbous bases, in youth white lower half, red upper half; in age, completely white. Centrals 3, 4 or 5, radiate semi-porrect; all except lower one similar to radials except they are white lower third, reddish upper two thirds and slightly less plumose; lower one 8 mm. long, hooked, yellowish white lower half, reddish upper half including hook which is curved downwards, heavily pubescent rather than plumose and, in age, red becomes darkish brown; base yellow brown, but not bulbous. It is the only hooked specimen of known plumose *Mammillarias*. In Latin, both Penna and Plumosa mean feathered. *M. pennispinosa* is not quite so plumose as *M. plumosa*.

M. candida has flowered during the year with the usual, large, typical *candida* flowers near the growing point. *M. Vonwyssiana*, so like *M. candida*, also flowered, colour purple, so it is correctly separated from *M. candida*. A so-called *M. candida rosea*, with the usual rose spines at the apex, also flowered, but it is decidedly not a *candida* variety as the flower is quite dissimilar, much smaller and appearing at the bulge of the plant instead of near the growing point.

For some time I have had three *M. surculosa*. One was suspected to be *M. Carretii*, and on receiving two *M. Carretii* from America, it proved that the suspicion was correct. These species have been confused by different authors, but it is difficult to see why, as the different sized areoles and colouring of the plants are so dissimilar. *M. Carretii* has quite large heads, simple in the case of my plants, as compared with the small, cespitose heads of *M. surculosa*.

M. Guerreronis is an extraordinary plant, elongating in its native habitat to as much as three feet, sometimes the spines are hooked and sometimes not. Study of the plants shows that when the spines are hooked it is rare to find one towards the top of the plant, they are invariably at the bottom of the plant and even then, very irregularly. Two plants received as *M. spinosissima* and four plants received as spec novae are very like *M. Guerreronis* and exhibit the same peculiar hooked spine characteristics, rather unique in *Mammillarias*, but the growth of these plants is from globose to globose-cylindrical. Obviously we must await flowering and fruiting to decide whether they are the same or different species. Incidentally, in the case of the spec novae, one plant fruited at the base of the plant, obviously from the previous season. It also flowered this year and the debris shows the site to be the top of the plant side! The large fruits were very typical of *Coryphanthas*, club shaped and green. A photograph was taken showing five fruits in situ, but when the prints arrived and taken to the plant for comparison, to my surprise the fruits had completely disappeared, only the scars left! We have no mice or other sizeable pests and can only assume that a bird came through the open window and took them!

A new arrival is *M. magallani*. This is a particularly interesting species with its snow-white appearance relieved in only some plants by a "top-knot" of orange coloured spines. It is very reminiscent of *M. denudata*. Dr. Craig described *M. magallani* as a new species, but gives *M. denudata* as a synonym of *M. lasiacantha* notwithstanding the pubescent spines of the latter.

I have two genuine *M. spinosissima sanguinea* and they make the *sanguinea* usually seen colourless in comparison. The spines are truly sanguinary and they stand out among the collection like a beacon. It is extraordinary that a new offset, at the bottom of the plant, has perfectly white spines with tips of red.

In the illustration pages will be found a reproduction of a photo kindly sent by Captain H. J. Dunne Cooke, of 15,000 plants bedded out at Norrköping, Sweden, in 1947. They include *Ferocactus canariensis*, *Dasylistrion glacophyllum*, *Cereus*, *Opuntia*, *Euphorbia*, *Leucophyta*, various *Echeverias*, *Haworthias*, *Mammillarias*, *Echinocactus*, *Aloes*, and *Cereus peruvianus monstrosus*.

MAMMILLARIA MOLLENDORFFIANA species novae. By E. Shurly

Radix primarius nullus. **Caudex** simplex, usque 70 mm. altus, globosus vel subcylindricus, mamillis subcylindricis in seriebus 13 x 21 dispositis praeditus, in axillis mamillarum lanatus et setosus. **Mamillae** spinis radialibus 24-28 albis subplanis coronatae, spinis centralibus 4-6 acicularibus fulvis rubris apice nigris armatae. **Flores** parvi, purpurei. **Fructus** purpureo-ruber. **Semina** fulva, ovata, rugosa.

Non tap roots ; simple (may possibly be cespitose at base), globose to sub-cylindrical, barely sunken at apex. Tubercles nearly cylindrical, tapering slightly at apex, heavily dotted with minute white wool, dull green, round in section, 6 mm. high, 4 mm. at base, watery sap, 13 x 21 spiral rows. Areoles small, spare, yellowish white, round, in age practically bare. Axils abundant short white wool, no bristles except in age when there are 4-5 bristles, short, white. Radials 24-28, dull chalky white, bare, flattish, 4-5 mm. long, radiate horizontally, but mostly rather irregularly, occasionally upper ones shorter, frequently most bunched laterally. Centrals consistently six on one plant, four on another and on a still further plant, generally four with an occasional six, crosswise when four, when six radiate regularly, a little above horizontal, stout acicular, light yellow brown with red apex and slight black tip, light brown bulbous base, become nearly white in age, 14 mm. long on plant with six, 6 mm. on plant with four, straight, smooth, almost horny.

Flowers ; in rows of one and two in axils of left spirals, round the bulge of the plant ; pointed buds, short white tube, 3 mm. long, campanulate, so small that they only come up to the tubercle apex and below the spines and were difficult to remove for dissection, 10 mm. long, 8 mm. wide when fully open. Sepals 8, oblong, tapering to point, entire, pale greenish white lower half, full red upper half. Petals 16, oblong with definite point, entire, yellowish white lower third, purple upper two thirds. Filaments purple, sometimes base is whitish. Anthers small, oval, white, pollen cream. Style 8 mm. long, yellow green at base, white in middle and merging to purple below the stigma. Stigma 4, almost long triangular, spreading, purple, scant whitish pubescence.

Fruits ; nearly top of plant side, 14 mm. long, 5 mm. at widest part, 3 mm. at apex, purplish red, bare, glossy, club shaped, juicy, but little pulp. Seeds about 30 in a fruit, very pale yellow brown, oval shaped with a pointed base which is light brown at tip, sometimes seed is slightly curved, surface slightly rugose, sub basal dot shaped hilum.

In its natural habitat, Hidalgo, Mexico, the plant grows up to 11 cm. high and up to 7 cm. wide ; grows "on bald limestone ground almost without shade, almost in hot full sun." This plant has formerly been confused with *M. Wiesingeri*, but it differs considerably from this plant. The plant was first discovered in 1937 by Mr. Fritz Schwarz of San Luis Potosi, Mexico, at whose request the plant is named in honour of Mr. H. Mollendorff "long years friend of mine, since I first started with Cacti, and who has always guarded my interests when I was out of town collecting." Mr. Mollendorff died during the summer of 1947.

According to the classification by Dr. Craig in his *Mammillaria Handbook*, the plant should be placed after *M. Nunezii*.

The type plant has been lodged at the Herbarium, Royal Botanic Gardens, Kew, Surrey, and my thanks are due to Kew for their kindness and assistance in the matter.

December 9th, 1947. H. Aylott : A Novice's Outlook.

I feel presumptuous in addressing you as my knowledge is limited, but the title of my address will excuse me. Who is a novice ? I have been collecting for eight years and still feel a novice and hope to learn from the questions and replies put up at this meeting and others.

Is a greenhouse necessary ? Certainly it is, if the collection is of any size. I made one like a glass case and heated it in winter by an electric bulb in a tin. This generated quite a heat and kept frost out and can be covered when necessary. In the early part of the year, you can take the front completely off and give as much fresh air and sunshine as possible. Later I built one 6 ft. by 4 ft. which was in the ground up to waist level. This conserved heat which was supplemented by an oil lamp which gave 40°. Do not try to increase radiation by putting tin over a larger bulb than 15 watt. Electricity always disperses itself in heat ; a greater dispersal of heat is by oil or water, but they give no more heat.

Seedlings grow very successfully in houses where fish are kept with a temperature up to 70°. Aladdin blue flame circular wick lamps are quite good. Oil lamps burn oxygen and, therefore, definitely do harm to plants. I recommend bottom heat for seeds, a moist heat will, perhaps, bring up seeds which have been too deeply planted, especially if soil is stirred up. Sandy soil and drainage and a steady, even heat is good for the plants.

Overhead watering and spraying is quite good, although this is not advisable for plants with woolly surface as it mats and spoils. A camel hair brush will brush off the surplus.

Echinopsis, in flower, attracted me very much in my early days, but now my fancy is stemless *Mesembryanthemums* as they do not take up much room. *Opuntias* have to take a chance in my cold greenhouse. Put plants outside in summer and they develop and flower much better, especially when kept dry through the winter.

Belonging to the Society benefits the members, especially in specialist subjects, as personal experience is more enlightening than reading books. I am full of optimism for the future and look forward to having plants I have not yet seen. I get much satisfaction when I arrive home in the evening tired and weary and go and spend an hour or so with my plants. Plunging pots in soil is beneficial, but see plants do not get a rapid rise in temperature.

AN INTERNATIONAL SOCIETY

By THE EDITOR

The first post-war suggestion to found such an organisation was made by Mr. Curt Backeberg. He approached me to accept nomination for the proposed Council, together with Mr. P. V. Collings. I asked for more details, but a further letter of his crossed mine, stating that Mr. W. Taylor Marshall, and Mr. Scott E. Haselton had accepted nomination and Mr. Collings and I felt it was sufficient justification for our acceptance, which was accordingly sent. As a result of a remark in a letter, I heard from Mr. Marshall that he knew nothing of his nomination and would definitely refuse it. (It is only fair to say that the American Journal has since stated Mr. Haselton accepted nomination.) In view of this, Mr. Collings and I withdrew our acceptance pending further information.

Nothing transpired until the receipt of the Swiss Cactus Society's "Sukkulantenkunde," June, 1947, in which there is an article by Dr. Eberle of Zurich, on "Thoughts on the foundation of a European Cactus Society," with a footnote by their President, Mr. H. Krainz, as follows:—"The Societies of England, Czechoslovakia, Germany, Austria, France, Belgium and Holland have already promised collaboration."

Astonished to learn that we had promised collaboration, a statement patently false, enquiries were made of the French and Dutch Societies and of pre-war members of the Belgian Society which has not yet been re-started. In each case, they definitely deny they have promised collaboration. From their comments, the following picture can be portrayed. The occupied countries would not participate in any body that had German domination of whatever source. They remind us that one of the most powerful and successful methods of the Nazis was the inter-penetration of cultural societies, gain the leading positions and impose their New World Order on its members. It was well known that the German Cactus Society (D.K.G.), under Doelz, acted in just this way and there is correspondence in existence stating, in words that cannot be construed otherwise, that German domination was their aim and that their dictums were final. Doelz' close associates were Mr. Backeberg and Professor Buxbaum. The former states he is not responsible for the actions of Doelz, but it is pointed out that it is not possible he and Professor Buxbaum were unaware of Doelz' activities, especially the arrest, imprisonment and torture of Fric and Kreuzinger. They were charged with being the Nihilists of Cacti and their offence was opposition to the Backeberg systems! This seems fantastic, but, unfortunately, it is simple truth. We must insist that we are not political bodies and we must adhere strictly to our scientific and cultural interests, but when others descend to politics and graft it on our subject, then we must refuse any part in the matter.

Indirectly, I learn that the Czechs gave formal consent, provided there was no German domination and that publications are in English, French and, only if necessary, in German, instead of only German as proposed.

It is not known whether Dr. Eberle's article is self-inspired or not or what part Mr. Krainz has played. It is known that Mr. Krainz is an ardent follower of Mr. Backeberg and an admirer of his botanical contributions.

Our own point of view is that we must hold the balance between the American and German cactus points of view, committed to neither side, but dispassionately considering both and supporting facts rather than prejudices. We have no animus against Mr. Backeberg because he is a German, although we consider his connection, as mentioned above, unfortunate. We are content to treat his cactus views with complete respect and to endorse them when we consider them justified, but we will not be party to domination from any side, American, German or any other. As a scientific body, free of politics, we retain complete freedom of view.

The ideals of an International Society are sound, but if there is doubt in regard to its parentage, its foundation would be a mistake and must, finally, result in failure. From a practical point of view, the foundation of a European or an International Society presents difficulties, but the value towards the progress of our knowledge of cactus and succulents could be incalculable, but it must be dispassionate progress and not for the purpose of supporting one school of thought or another; the proposed organisation would, necessarily, have to be founded on democratic lines and must debar no responsible body of people from presenting their point of view which must receive due consideration, but when such due consideration has been fairly and equably given, then the decision must be binding. The difficulties bristle, but with goodwill there is no doubt they can be resolved and our subject greatly benefited. Cactus enthusiasts in Great Britain will welcome any reasonable scheme for a European or International Society and any proposals, from wherever they may come, will receive our sympathetic consideration with a bias towards their acceptance.

REPORTS OF MEETINGS

November 4th, 1947. A. J. Edwards : Greenhouse Heating.

I wish to make the main theme electric heating of greenhouses because by training and experience, as a cactus collector, I am completely satisfied that it is the only practical method and its use obviates the many disadvantages of older methods.

With paraffin lamps there is the very real danger of sooting up, covering the whole of the greenhouse and its contents, which has been experienced by many.

Water pipe heating is, undoubtedly, very efficient, but the lag of time heating up, the constant attention needed and many other points prevent it being the ideal. Who has not stoked and filled up his boiler late at night with rain washing down his neck, to wake up in the morning to find that, owing to a rising wind, his fire has burnt completely through, the heat during the night far higher than needed and then, completely cold before dawn? With electric heating, thermostatically controlled, it is a case of "Switch on and leave it to me." There is no outside work in inclement weather, simply switch on, the apparatus warms up quickly and the thermostat switches on or off at the figure at which it is set.

What do you need to take note of when installing electric heating? What will it cost you?

Take, for example, a small greenhouse 5 ft. wide, 6 ft. long, and 7 ft. high (4 ft. to the eaves with 2 ft. brick base). Heat required 45° . You need a kilowatt loading of .56 kw. taking the basis of an outside temperature of 32° . For those who have practical knowledge, the kw. load and temperatures above 45° are as follows: 50° —.72 kw.; 55° —.88 kw.; 60° —1.12 kw.; 65° —1.28 kw. I presume you propose to have tubular heaters; the length of tubing required can be arrived at by dividing the figures mentioned in the last paragraph into the wattage of the tubes, which is usually 60 watts per foot, but can be 75 or 80 watts. Make allowance when setting the thermostat for a margin of safety. Where high temperatures are not needed, calculate for 65° and set the thermostat at 50° . You do not consume more current by having that little extra heating tubing. This provides for a really hard winter. Tubing can be purchased in the required lengths or banked up short lengths of three or four rows, with the lot coupled together, and the necessary brackets for fixing them.

There are two types of thermostats; D.C. (direct current) and A.C. (alternating current). Your thermostat must tally with the type of supply you have. An average thermostat on A.C. will carry up to 3 kw. with a potential voltage up to 250 v. The two types are of different construction, D.C. types break the current in a mercury tube which is operated by a bi-metal strip. A.C. types also operate by a bi-metal strip, but the current breaking contact is what is termed "air break." The size of the cable used for connecting should be adequate for the load and in galvanised conduits or lead covered cables. I cannot too strongly press the advisability of having the installation properly fitted by competent hands to avoid the danger of fire, electrocution and, also, what is so important today, to economise as much as possible, as faulty fittings are the most expensive things you can buy no matter what price you pay for them.

The thermostat should be fixed at approximately 4 ft. 6 ins. to 5 ft. from the floor, it should be fixed to a board for greater accuracy. The function of a thermostat is that of an automatic switch and does not regulate the amount of the current, once switched on, and the heater warmed up, the heat in the apparatus remains constant until the change of temperature permits the thermostat to switch off.

As to running cost, at all-in rates, with the example of the greenhouse sizes already mentioned, warmed to 65° , our load would be 1.28 kw. Assuming the rate is $\frac{3}{4}$ d. per unit, running for twelve hours a day, would cost approximately 11½d. per day, but taken over 365 days in the year, the average would be approximately 3/- per week. It is assumed you are already paying the standard charge on your meter, whether you had the additional load put on or otherwise.

October 9th, 1947. Captain H. J. Dunne Cooke : Succulent Plants in London.

When I moved to my present business-cum-living premises in Soho, with 1,500 square feet of roof, the Crittall Co. erected a greenhouse on the roof and I constructed many boxes of a size to be covered with the ordinary Dutch-light. There I grew the best of the shrubby *Mesembrys*, *Faucarias*, *Glottiphyllums*, various cacti, *Haworthias*, *Euphorbias* and also *Gazanias* and other S. African plants. The position is such that they get the maximum light, but one still has the disadvantages of wind and dirt; largely for the latter reason, I have continued to specialise in plants which develop either new bodies or leaves. I have found that most of the succulents will grow quite happily under Dutch-lights, if they are kept bone-dry from September onwards, and I run my electrically heated and thermostatically

controlled greenhouse with the thermostat set at 45° until December, when I reduce the setting to 40° and keep the atmosphere as dry as possible.

I grow the succulents either in good porous pots or grouped in pans to resemble their natural surroundings as nearly as possible. I do not believe that it matters much what the compost is, so long as it is exceedingly porous and I generally sift out the dust with a very fine sieve and use what does not go through ; I find that a pot immersed to within about $\frac{1}{2}$ " of the soil level should soak through in about one minute. The pots should be very well crocked and I generally put a pinch of naphthalene flake among the crocks, as a deterrent to root mealy bug. If you suspect this, and do not wish to repot, you can rub the bottom of the pot in naphthalene flake, making sure that the hole at the bottom is completely filled. Paradichlorobenzene can be substituted for naphthalene flake and is generally recommended. A suggested compost would consist of a bucket of very coarse, Cornish sand, a bucket of sterilised medium loam, a handful or two of mortar rubble and three or four handfuls of crushed eggshells. I do not recommend peat, leaf mould or manure, but hoof and horn meal is perfectly safe. I always pot with perfectly dry potting soil, settled by tapping on the potting bench. If the plant has not been cut and the roots have not been damaged, I soak it in two days time ; if the roots have been damaged or the plant cut, I do not soak it for a week or a fortnight, but it is impossible to lay down any hard and fast rules about this.

With regard to watering, I believe that those who are sufficiently interested will find out somehow where the plants grow naturally and under what conditions. Some get very little water at any time of the year, but require occasional water right through the year ; others require no water at all for considerable periods, but do not seem to mind how much they get at the proper period (corresponding to the rainy season in their natural habitat). In this latter class, we have the whole of the genus *Conophytum*, for example ; I give them no water from February till July and I then start to water those whose outer coats have completely dried up ; the bilobes, such as *frutescens*, *notabile* and *compressum* are the first to flower. The *Lithops*, on the other hand, get no water from Christmas till May, and, then, I treat them in the same manner. It should be noted that the *Lithops* are far more sensitive to over-watering than the *Conophytums*. Many others, such as the genera *Pleiospilos*, *Argyroderma*, etc., can be quite safely left without water until there is only one pair of leaves. In fact, I rather believe that it is one of the best ways to get flowers.

It is a moot point whether the old " coats " should be removed from *Lithops*, *Conophytums*, etc. ; presumably animals, torrential rain, wind, etc., do the job in nature, but I have handled imported plants with years of old debris remaining and, in the case of *Conophytums*, broken heads re-rooting in this debris. I occasionally clean up my plants a bit, but it should be noted that no force whatsoever should be used. The usual reason advanced for cleaning up succulent plants is that the old leaves cause rot ; I can assure you that damage caused to plants in the process of cleaning up is far more likely to cause rot than leaving the old " coats " on ! In this connection, I quote from a letter just received from Mr. Hall, describing a picnic on the sea-shore within an afternoon's run of Cape Town. He says that " *Cheiridopsis* were growing on the tops of the bare rocks, thousands of them, forming compact cushions like mosses do in Devon. They were half buried in small fragments of the broken granite and the only soil consisted of the humus formed from their old leaves and stems. For hundreds of yards along the beach, the same species colonised the tops of rocks ; yet not a single plant did I find in the looser and more covered slopes of the ground where hundreds of other succulents grew ; all of them were drenched with salt spray."

One of the great advantages of the genus *Conophytum* is that, to the best of my knowledge and belief, it is not attacked by any single pest. However, most of the other succulents are, at least, as subject to pests as the cacti themselves. I agree with Mr. Boarder that a solution of pure nicotine in methylated spirit of approximately 2½% strength is the handiest thing to have in the greenhouse, for application with a camel hair brush ; but it should be noted that scale can be got rid of by syringing with very hot water (it is surprising how hot the water can be) ; the best general antidote for red spider is a Pan-Britannica product called Dynone II, which is perfectly harmless to plants, if used as directed, and which can be mixed and kept ready ; it does not deteriorate after mixing with water and it may interest you to know that it also controls white fly.

I have always specialised in the small growing succulents, including cacti ; you can grow so many more and have so much more variation and I have always failed to understand the enthusiasm for gigantic specimens, which have been bought when they were gigantic and really show very little sign of alteration from year to year. I have a little *Echinocactus bruchii* which I have had in my possession for nearly 15 years and I doubt if it has increased more than 10%, but it never produces less than four beautiful flowers and, sometimes, six in a year ; I have also a specimen of *Epithelantha micromeris*, commonly known as the Thimble Cactus, both of which give me much more pleasure than a mighty plant of *Echinocactus Grusonii*. I do feel that every encouragement should be given to people, here in London, where accommodation is so very limited, to grow the smaller species, in variety, rather than one or two great dust collectors on the window sill !

continued on p. 19



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SOCIETY NEWS

Meetings : February 17th : Annual General Meeting.

March 16th : A. Boarder—Cacti and Succulents from Seed.

April 13th : P. V. Collings—Pests.

The Librarian reports a brisk demand for books notwithstanding the close season, but he regrets that some members will persist in keeping very popular books, and he is afraid he must institute a black-ball system whereby persistent transgressors will be put at the end of the list instead of their normal turn, even, in some cases, delete them all together ! So, please return your books promptly.

Possibly some members do not understand the working of our very valuable Exchange Service of which Mr. A. Boarder, Marsworth, Meadway, Ruislip, Middlesex, is the hon. secretary. In these times of impossibility of importing plants it is one way of increasing your collection. Mr. Boarder should be written to if you have duplicates or other plants which you want to exchange. He then communicates to other members who may be interested, and puts them in touch with you. By this means you can get plants from other members. Do not send plants to Mr. Boarder.

During 1948 we want to institute a membership drive, and we trust that every member will introduce the Society to any collector of our plants. If our membership is increased we shall be able to provide bigger and better advantages including the Journal. The Council proposes to award prizes of plants to members obtaining the most new members, so do your best !

1948 should also see the institution of branches. We have had some offers to act as secretaries in the areas, but we are anxious to hear from others so that definite steps can be taken. This step would enable all members, wherever they are, to enjoy the fullest possible advantages of membership by attending meetings, talks with fellow members, etc.

The Council greets the members on the occasion of this our first number of the tenth volume, and trusts that all those who have not yet remitted their subscription of 21/- for 1948 will make it easier for the Treasurer by sending at once.

We extend a hearty welcome to the Cactus and Succulent Society of Australia of which Mr. Lex Fuau, of 1 Broadway, Camberwell, Victoria, Australia, is the secretary. The subscription for Great Britain 8/6 per annum which includes a Journal which it is hoped to publish in 1948.

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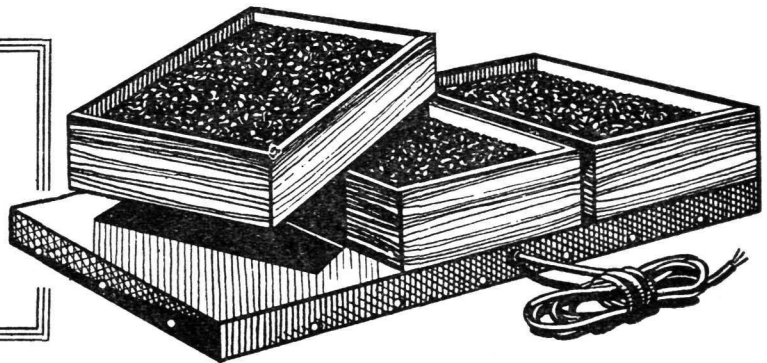
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THE CACTUS AND SUCCULENT JOURNAL OF GREAT BRITAIN

Established 1931

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APRIL, 1948

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EDITORIAL

This number of the Journal completes the second year since our re-commencement after the war. We trust that members and subscribers feel that its publication has been a worth while contribution to our knowledge of cacti and other succulents.

It is still to be regretted that so much of our material has to be drawn from overseas. We are afraid that the ordinary member is a bit too shy to venture a public statement of his own experiences and opinions, and that he thinks contributions should be left to those more experienced with our plants. He forgets that, in this country, the numbers of the informed and the specialists are so few that it would be impossible to run a Journal on their contributions alone. The overwhelming majority of the members of any cactus society are beginners and amateurs, and every cactus Journal has to be mainly written to help the beginner; scientific material has to be severely restricted. Those of us who think we know a little more than most about our subject freely admit that the veriest tyro can give us points and we, and they, welcome your own personal contribution.

Another phase that has made the past months remarkable is the plethora of material on succulents other than cacti, and the dearth of material on cacti. We would ask members and subscribers at home and abroad to let us have contributions on cacti, otherwise this, the most important phase of our subject, will become neglected.

It is not usual to comment on new publications in the Editorial, but we have just received a copy of Professor Nel's new book "*Lithops*." It is so comprehensive and such an important contribution to our knowledge that we feel it merits special comment and we would recommend all those interested in *Mesembryanthemaceae* to acquire this book. The price is high, five guineas, but the contents of the book fully justify its cost.

One other matter I would like to refer to in this number—photographing cacti and other succulents. There is included in this number a photograph of a plant by the Editor, which is one of the results he has obtained by experiments during the past winter. Reference to any published work on our plants will prove how impossible it is for students and others to try and identify from illustrations of cacti particularly, and the letterpress descriptions are usually only too vague and confused with other species to be of anything other than contributory assistance. We would like members interested in photography to centre on improving their photographs and it is hoped that the publication of this photograph and the new section in the forthcoming exhibitions will contribute towards a great improvement in illustration. We would welcome hints, articles or other matter that would add to our knowledge of photography of our plants.

CULTURAL NOTES

By A. BOARDER

The next few months are those in which we may reasonably expect a fresh growth to appear on our plants. The new growth at the growing point on the top of the plant will tell you plainly when the plant is actually growing and when you must start regular watering. I have come to the conclusion after many years of experiment that it is better to keep seedling plants slightly on the damp side all the winter than to keep them dust dry. I know that a great deal depends on the atmosphere in which the plants are kept. If the plants have wintered in a place where the temperature has varied from 50 to 60 degrees, then an occasional drink will have helped to keep the small rootlets alive, and then when watering is begun in earnest the plants can immediately derive some benefit therefrom. If, on the other hand, the plants were dried off completely at the beginning of the winter, it is necessary to proceed with great caution. The tiny rootlets may have died during the winter and the remaining larger roots are quite inadequate to absorb the water. I am sure that many plants are lost annually by members starting to give too much water in the spring to plants which have been completely dried out in the previous autumn. If it is possible to keep a little warmth in the greenhouse all the winter I am sure that the plants get away to a flying start in the spring, when they have had a little water in the winter. I can already see the advantages of having given my plants an occasional watering during the winter. They almost without exception look healthy and growing, and many were showing tiny flower buds by the end of February. Several of the *Mammillarias* are in bud, and also there are several buds on the *Rebutias*. When you see signs of growth on any of your plants you may give those plants more water, but remember what I have said before, and that is, do not water again until the plant has almost dried out. This may happen within a day if the weather is right, or it may take a week if the weather has turned very dull. Do not water all your plants every time, but just give water to those which actually need it. Many good gardeners use a cotton reel on a cane with which to tap the pots to see if they require watering, and some use an old bone. Whichever method is adopted, it is most important that water is never given to a pot in which the soil is still wet. You can easily learn a lesson in watering by buying a *Cyclamen* plant in a pot from a florist. Give this plant a drink each day or before it has had a chance to dry out and I will guarantee that you will lose the plant within a fortnight, and this will be the case if you try to overdo the watering of almost any plant in a pot. If you consider the type of country in which Cacti naturally grow it is little wonder that these plants are so easily killed by overwatering.

When it is obvious that the plants are growing well and are showing flower buds you may consider the question as to whether to give any form of fertiliser. I am not going to tell beginners to use any form of powder fertiliser, but they can with safety stick to bone meal or hoof and horn grist mixed with the potting soil. On the other hand, to those who are a little more advanced in the knowledge of growing these plants I say, try a little fertiliser to those plants which are making good growth and to those which appear to be carrying a fair amount of flower buds. The fertiliser can be in the form of one of the well-known proprietary makes, or the very useful National Growmore. Whichever kind is used never overdo it. Go by the directions on the package as the firms are best able to give you detailed instructions as to what is the correct way to use a particular brand. I must, however, give a word of warning here. Do not on any account give fertilisers to a sickly plant in the hope that it will buck it up and make it grow. Nothing is further from the truth. The plant will surely die if you are so tempted. Only give fertiliser to those plants which are very healthy and are obviously growing. It is such plants only which can benefit from an application. Do not give too much at a time. It should not be given more often than once a fortnight, and then only in small quantities. Some growers use old rotted manure for their plants and very many will benefit from this. The best way to use it is to scratch over the surface of the soil in the pot and sprinkle a little of the powdered manure on the top. The subsequent watering will ensure that the plant receives the nutriment in small doses, which is the best way to administer it. You would not take the whole box of pills which the doctor ordered, at once, and so don't try to give your plants their medicine at one dose.

On all sunny days from now on you may spray the plants in the mornings. I know that this is a very contentious subject, but I have sprayed all my plants very often, sometimes every day for weeks, if the weather is right and they have come to no harm. Of course, you must not spray in very dull weather, or when it is very cold. When the real hot days come you may spray in the evenings and close the greenhouse up when all is warm and moist. I know that many plants thrive exceedingly with this treatment. I spray *Lithops* as well as *Mammillarias* and find that it does them no harm. My tiny seedlings are never watered any other way. It would take me too long each day to immerse each pot in water, and so they have to be sprayed. From now on you should give liberal amounts

of fresh air to the plants. A greenhouse soon warms up with a little sunshine, and you will find that as the year moves towards summer it is beneficial to all plants to give as much air as possible at all suitable times.

I am now going to give a few hints to those members who have no greenhouse but have to grow their plants in windows in a living room. Many of our members live in flats which have no gardens, and we can only marvel at the splendid plants which some of them are able to grow. It is essential, however, that before one decides to grow Cacti in a living room, the amount of sunshine which the room may receive must be considered. It is almost impossible to grow these plants successfully in a room which does not get a fair share of sunshine. Now, I expect, some people will write and tell me that they do grow Cacti in such rooms, but I venture to suggest that I could immediately tell such a plant by its appearance. No, I am afraid that to be on the safe side with Cacti you must have some sunshine. From these remarks you will see that it is imperative that the plants in a room should be placed where they can get the maximum amount of sunshine. It is surprising how soon plants will dry out in a living room during the winter. I think that a little water could be given safely throughout the winter where there is a fire in the room. If you have been keeping the plants very dry all the winter you must be careful how you commence to water in the early summer. If the plants have become at all dusty they must be sprayed well and left on their sides to dry off a little, otherwise they may receive too much water at the roots. The plants should be repotted if the soil has become sour, which is almost certain. After repotting, do not water for about a fortnight. The soil which you use for potting should be damp at the time, but by no means wet. The usual test is to ball some of the soil up in the hand. It should just about hold together without making the hands wet, and it will then be in the correct condition. If the soil is too dry for potting, water it and then leave it for a few hours, as otherwise it will make things very messy, and probably cause the soil in the pot to cake too much.

Many kinds of Cacti and succulents can be grown in a living room, and a little experience will soon teach you which are the best kinds. For the very beginner, I would suggest a mixed collection of Cacti and succulents. Among the Cacti are such easy growing kinds as the *Echinopsis* and the smaller growing *Cereus*. Some of the *Mammillarias* are very good, but many are very difficult to grow even in a greenhouse, and so be careful which kinds you start with. The *Cereus flagelliformis*, a very showy plant when in flower, can often be grown better in a living room than in the average greenhouse. *Notocactus Ottonis* is a plant which will grow and even flower in a room, and many of this group are equally good. Many *Opuntias* grow well but will rarely flower indoors. Among the other succulents are many which will thrive well. The popular *Aloe variegata* or the partridge breasted *aloe* is one which rarely fails to give satisfaction. When purchasing from a dealer, please tell him where you intend to grow the plants, as I am sure that all reliable dealers will be only too pleased to advise you as to your choice of plants. It is no advertisement to them to supply plants which are obviously unsuitable for indoor culture; and so leave the choice to them.

I have been asked by some members as to the correct method of watering *Lithop* seedlings. The adult plants have a resting stage when water should be withheld, but I do not rest my *Lithop* seedlings during their first year of growth. They will probably make more than one pair of leaves or stems, but they come to no harm this way and I have found that it is safer to keep these small seedlings growing all the time, than to dry them off as you do the adult plants.

One or two members have had trouble with a black fungus-like growth on some of their plants, especially the *Opuntias* and *Euphorbias*. This, I believe, is caused by a very damp atmosphere. It is always more prevalent in the winter in the full days, and the prevention of it is far easier than the cure. Keep things as dry as possible in the greenhouse with plenty of fresh air. Dust the affected parts with flowers of sulphur, and see that all pots are thoroughly cleansed before repotting.

Many lose seedling Cacti with damping off disease, although they may have used sterilised soil. Remember that the water with which you water the plants can easily become infected with various diseases, and so if you use a tank in your greenhouse in which to store rainwater, be sure to give it an occasional cleansing to make it sweet and pure.

One of the safest mediums for sterilising water is to add a little permanganate of potash to the water until it is a very deep pink colour. This is harmless to the plants and helps to kill the algae often found in water which has been exposed to the atmosphere and which will form a coating of green on the tops of the soil in the pots.

When your plants have formed seeds, please see that they are correctly labelled and never mix two or more kinds together. Remember, you may like to give away the seeds or exchange them and so pity the poor grower who has to try to name the resultant mixture. I have just raised hundreds of *Mam.* seedlings from a mixed packet of seed sent me from a collection of nine hundred specimens in California, and so I know what I am talking about.

"Notes for Beginners"

SOME MORPHOLOGICAL ASPECTS OF SUCCULENT EUPHORBIAE (Part I)

By J. R. JANSE, F.R.H.S. (Hillegom-Holland)

It is a most interesting fact that succulent *Euphorbiae* display such a varied habit in growth, spines or thorns and succulence. To begin with succulence, it must be considered that from the usual herbaceous type to those remarkable extreme succulent forms there is merely a very gradual change.

The herbaceous species, widely known as Spurge, and very common in our native flora, gradually pass into succulent forms, in the first place beginning with a periodical development of the foliage.

Our diagram, Fig. 1, represents the only succulent species indigenous to the European Continent, *E. dendroides* L. This species occurs along the Mediterranean coast, and bears its foliage only during the wet season, viz., during winter. Such species with periodical leaves are also to be found among the species of the Canary Islands, viz., *E. balsamifera* and *atropurpurea*.

A further step to succulence is demonstrated by *E. mauritanica* L. (Fig. 2) with smaller leaves which are very soon deciduous and only function on the youngest twigs; the green stems performing the necessary assimilation.

Total absence of foliage may be observed in *E. aphylla* Boiss. (Fig. 3), another inhabitant of the Canaries.

Although, in the overwhelming majority, the leaves play only a very secondary part, being absent or only occurring as deciduous scale-like organs, some species have retained the foliage in those cases in which the stems show an extreme adaptation to a dry climate.

A good example of this type is the section *Treisia* Haw. with succulent stems and a crown of leaves at the top of the stems (Fig. 6); this section contains *E. bubalina*, *clandestina*, *bupleurifolia* and *clava*.

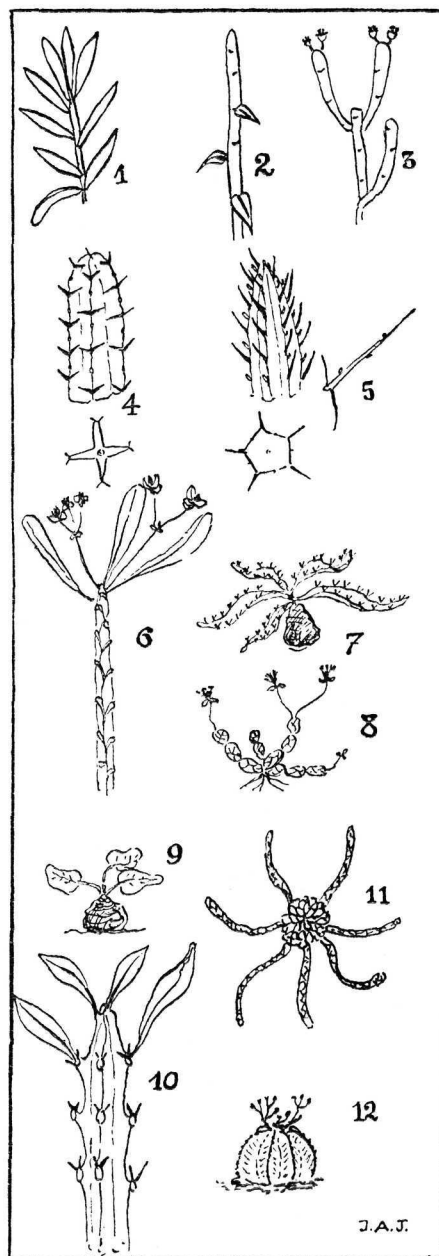
Increase of succulence is often connected with an increasing protection of the plants by spines or thorns.

Spines of *Euphorbias* can have a different origin. A large group of species is characterised by so-called "stipular spines," almost always occurring in pairs, one on either side of the leaf base. It is very acceptable that

TEXT TO DIAGRAM

1. *Euph. dendroides* L.; 2. *E. mauritanica* L.; 3. *E. aphylla* Boiss.; 4. Sect. *Diacanthium*; 5. Sect. "*Anthacantha*"; 6. *E. bubalina* Boiss.; 7. *E. stellata* Willd.; 8. *E. globosa* Sims; 9. *E. tuberosa* L.; 10. *E. Nivulia* Ham.; 11. Sect. "*Medusea*"; 12. *E. meloformis* Ait.

Origin J.A.J.



J.A.J.

these stipular spines are to be identified as modified bracts. Boissier grouped all the species bearing stipular spines together in a large section, called *Diacanthium* (Figs. 4, 7 and 10).

Diacanthium must be a group of relatively old age, displaying a most varied habit and occurring in the whole area occupied by succulent species. Tropical species often show a regular development of leaves which often remain on the plant for the great part of the year (Fig. 10).

A very interesting series of this section form the *Scolopendriae* (Fig. 7), embracing some dwarf growing species. The tuberous main root, buried in the soil, sends out a number of creeping sub-erect and twisted stems. In *E. stellata* Willd. a rare example of two angled stems may be observed, the upper part being flat or slightly concave, the underside very convex. Strong growing stems, however, often pass into a three angled stem, which even become four angled in the related *E. squarrosa* Haw.

Another, quite different type of spines (better called thorns) is found in a group of nearly related species from South Africa, the so-called *Anthacantha* Section (Lem) (= *Florispiniae* Haw.) (Fig. 5). Both names indicate the peculiar adaptation by which a peduncle, bearing the inflorescence (cyathium), hardens into a rigid spine. Very small, reduced and quickly deciduous bracts, which are still present on the young spine, enable us to recognise the original peduncle, even in those cases when the modified peduncle no longer bears an inflorescence. In *E. stellaespina* Haw. we may see the branched peduncle hardened into a spine. Habit of growth is also extremely variable. Dwarfs, hardly attaining a hand's breadth in height and giant trees, which often form a characteristic part of the vegetation, may be found in this genus and every intermediate form exists.

Some dwarf species represent a type as No. 8 of our diagram, a creeping mass of swollen joints, somewhat irregular in growth. Examples of this type are *E. globosa*, *Herrei*, *ornithopus* and *tridentata*.

An interesting phenomenon in the growth of succulent *Euphorbias* is the so-called "fixed induced modification" (Baur). Already in arborescent species of the *Diacanthium* Section we may observe, in some species, a distinct difference between the many angled main stem (later becoming more and more rounded and woody) and the three, four or five angled side branches, but cuttings of side branches are still able to pass into a main stem when planted apart. For these arborescent species Berger adopted the discriminative terms "heterogeneous" and "isogonous," the latter not being differentiated by a distinct main stem and side branches.

The forms, popularly called "Medusa Heads," show a further step to heterogeneous growth. The thickened, globular or obconic main stem sends out a number of spreading side branches, the whole resembling the Head of Medusa of antique mythology, a head covered with snakes. Side branches, treated as cuttings, develop roots and begin their individual life. Although they are able to remain alive for a very long time and even develop side branches, a modification of the main stem in its characteristic original form is but very seldom observed. This phenomenon, also demonstrated by *Araucaria* is called "fixed induced modification"; perhaps these phenomena are due to the action of certain phyto-hormones. *E. caput medusae* L. never returns to the original form when propagated from side branches, but it is reported from the related *E. inermis* Mill.

It is a very interesting fact that the Medusa Head type has arisen in systematically distinct groups of succulent *Euphorbiae*.

Cultivated specimens of Medusa Heads do not show the natural habit of growth; in their native habitat the main stem is partially or wholly buried in the soil and only the side branches (or even their tips) are exposed to the light. This is also the case with *E. tuberosa* L., a rarely cultivated Cape species (Fig. 9), whose tuberous main root only develops a crown of herbaceous leaves and stalked involucre. Boissier erected for it a sub-genus, called *Rhizanthium*. This type reminds us of the genus *Jatropha*, chiefly American *Euphorbiaceae*, now and then cultivated in succulent collections.

Finally, we mention a quite remarkable type, represented by *E. Monteiroi* Hook.f. (= *Marlothii* Pax.). Its branches, densely covered with dried leaf scars, are naked and woody, and in the growing season develop leaved twigs bearing the inflorescences, surrounded by well developed bracts.

Our next part will contain some remarks on the interesting inflorescences of the *Euphorbias*, the cyathia.

A hearty welcome is given to "The Spine," the Journal of the Cactus and Succulent Society of Australia. The Editor of this new Journal is to be congratulated on an excellent turn-out, but what calls for special commendation is the courage of the fifty members of the Australian Society in issuing a thirty-two paged, illustrated Journal. We, in this country, with the experience of seventeen years are amazed, and we can only wish the greatest of success to this daring and competent venture.

THE HARDY SEMPERVIVUMS

By THE EDITOR

At the Annual General Meeting, a special request was made for an article on the hardy *Sempervivums*, because, as they are hardy and not a greenhouse subject, they have been neglected by writers within our subject. Most people, whether interested in succulent plants or not, have some specimens of these popular plants in their gardens.

The Latin name *Sempervivum* means "ever living," referring, obviously, to their hardihood in surviving vicissitudes in the driest of environments. They belong to the Family *Crassulaceae*, and have been segregated into a separate genus because they differ from other genera in the Family in their free carpels, stamens twice as numerous as petals, free petals, flowers six to many parted. The genus is separated into two separate sections, *Eusempervivum* and *Jovisbarba*.

The standard work on the genus is that by R. Lloyd Praeger, D.Sc., published by the Royal Horticultural Society in 1932. There, the author gives the official description as :—

"Stemless or short stemmed perennial herbs increasing by auxiliary stolons (except *S. Heuffelii*). Leaves alternate, rosulate, crowded, entire, fleshy, sessile, usually obovate, acute or acuminate, convex below, ciliate. Cymes paniculate. Flowers whitish, yellow, red or purple. Calyx green, fleshy, cup-shaped, six to twenty parted. Petals free, as many as the calyx segments. Stamens twice as many as the petals. Scales small, more or less quadrate. Ovaries equalling the petals in number, immersed at base in the receptacle."

There are twenty-three different species and they all have their habitats in Europe, mainly in the Alps but extending by a few westward to the Pyrenees and a few eastward to the Caucasus with a number in the Balkans and the genus dies out in Turkey and Asia Minor. The solitary exception is *S. atlanticum*, the habitat of which is Morocco. *S. montanum* grows at an altitude of 11,000 feet, but the other species favour a habitat at an altitude of 3—6,000 feet. At the higher altitude they are covered by snow for the major part of the year and, in consequence, their growing season is very short and they, probably, never flower at this height.

The genus is early in its evolutionary development, but the flowers seem to have lagged behind the vegetative parts in their evolution.

Formerly, *S. tectorum* was considered to be a cure for wounds and burns, fever, catarrh, deafness, etc. *Sempervivums* are often found on roofs, and earlier were held to proof the building against lightning. Like so many of these old beliefs there may be some sound reason for it inasmuch as the old buildings on which *Sempervivums* flourish are extremely dry, and because of this survive where other plants would die; it is well known that water is a good conductor of electricity and, consequently, lightning seeks a wetter route to earth than the old, dry building.

They are very free from disease and pests, but they are attacked when in their wild state by a fungus, but are rather free of this in cultivation. This fungus increases the bulk of the leaf and often only one side of the leaves and the plant may become bulky and present a rather queer impression. It is no cure to remove the leaves affected and the only way to eradicate the fungus is to destroy the whole rosette, not only simply the diseased leaf.

The flowers are not beautiful, seen ordinarily, but when examined with a magnifying glass they disclose a beauty that is surpassing and are reminiscent of the minute flowers of *Euphorbias*. The rosettes are monocarpic, that is to say, they invariably die after flowering. The stolons or runners live on, but occasionally they turn into flowering shoots and, when they have flowered, the plant is lost.

There are three methods of dividing the plants: colour of flower, hairiness and the length of the stolons. Size is not a dependable feature as this is controlled so much by the condition and dryness of the soil. The three divisions and the species are given :—

Colour of flowers.

Eusempervivums. Red or purple. *S. arachnoideum*, *atlanticum*, *caucasicum*, *dolomiticum*, *erythraeum*, *Kosaninii*, *macedonicum*, *montanum*, *pumilum*, *Schlehanii*, *tectorum*.

Yellow or white. Petals 12—16, wide spreading. *S. ciliosum*, *grandiflorum*, *Kindingeri*, *leucanthum*, *Pittonii*, *ruthenicum*, *Wulfenii*.

Jovisbarba. Yellow or white. Petals 6—7, erect. *S. Allionii*, *arenarium*, *Heuffelii*, *hirtum*, *soboliferum*.

Hairiness.

Leaves hairless except on margins. *S. arenarium, caucasicum, hirtum, soboliferum, tectorum, Wulfenii.*

Hairy or downy on face and back as well as edge. *S. Allionii, arachnoideum, atlanticum, ciliosum, dolomiticum, erythraeum, grandiflorum, Heuffelii, Kindingeri, Kosaninii, leucanthum, macedonicum, montanum, Pittonii, pumilum, ruthenicum, Schlehanii.*

Length of stolons.

Short (practically none) stolons. *S. arachnoideum, erythraeum, pumilum, Schlehanii, atlanticum, ruthenicum, Kindingeri, Pittonii, Heuffelii, Allionii, hirtum, soboliferum, arenarium.*

Long stolons. *S. dolomiticum, macedonicum, Kosaninii, tectorum, caucasicum, grandiflorum, leucanthum, ciliosum, Wulfenii, montanum.*

Sempervivums hybridise extremely easily in the wild as well as in cultivation and, in consequence, there abound hundreds of hybrids which, by being named, have created complete confusion among collectors and only too many dealers seize the opportunity to add to their list of plants for sale. Praeger lists under *S. tectorum* no less than sixty-six synonyms and, in addition, there is a long list of garden names, a very large proportion of which emanate from the same species. Hybrids have been detected with *S. arachnoideum, montanum, tectorum*, (these very freely hybridise), also *ciliosum, erythraeum, grandiflorum, Pittonii, ruthenicum, Schlehanii, Wulfenii*. According to Praeger, no hybrids are known of *S. Allionii, arenarium, Heuffelii, hirtum, soboliferum*. It should be noted that those species of which no hybrids have been found are all of the sub-genus *Jovisbarba* which do not hybridise with *Eusempervivums*.

It is difficult for all but the expert to separate hybrids from a collection, but, generally speaking, it can be stated that if the flowers are pale pink or purple, or reddish yellow, they usually indicate a hybrid. With *S. arachnoideum*, hybrids always have broken hairs between the leaf tips; the true species has hairs from leaf tip to leaf tip.

Because of this facility of hybridisation it is advisable not to reproduce by seed, but only by cuttings which root very freely.

I have not room to detail the species, but reference to Praeger will give the fullest possible detail together with drawings of the plants, but the schedules given above of the separation of the species by flowers, hairiness and stolons should enable the collector to quickly place plants and the different placings of these characteristics in the schedule should enable further closer identification. For instance, *arachnoideum* has red flowers, is hairy and has short stolons, on the other hand, *caucasicum* has red flowers, is hairless and has long stolons.

Sempervivums are extremely easy to cultivate in the open air. They live, but are rather impatient of cultivation in greenhouses because they do not get fresh air, rain and full sunshine; air, I believe, to be the main cause of this diffidence to grow and multiply in greenhouses. They are so easy to grow in the open air that plants dropped off clusters, roll down and soon root on their own. In fact, it is quite true to say that you can establish *Sempervivums* by simply throwing them on the soil.

However, it is best to grow them in a more orderly manner and a few words on the site, soil, etc., will be appropriate. First, as to the site, they normally grow on mountain sides where the soil is a mere covering over a bed of sheer rock. In consequence, they do admirably in a rockery between the stones and even if they are planted in a pan of rock with a little soil they will grow well. But it is always advisable to let them have reasonably good soil although they do not want leaf mould, rich compositions, fertilizers, etc. The most important necessity is that the soil should be completely porous and that no stagnant water can remain, the hairy types are especially impatient of moisture. They do not need watering and can be left entirely to the vagaries of the weather. In very dry weather, it will be found that the rosettes close up, but they soon open up when the slightest rain falls. Until the rosettes completely close up, even the most cautious collector need take no trouble with watering owing to their succulence and it is only in extremely exceptional dry weather that they need to have any water.

Sempervivums reproduce freely by rosettes on the end of stolons or runners which come from the base of the plant, below the leaves. The only exception is *S. Heuffelii* (*Jovisbarba*) which increases by the parent rosette splitting into two or more rosettes as well as by rosettes forming direct from the rootstock.

The Hampshire Market Produce Show Committee, 5 The Cloisters, Burgess Road, Southampton, are holding a Hampshire Market Produce Show incorporated with the N.F.U. Market Produce Show on Southampton Common, a site of several acres, on June 18th—19th, 1948, and they would welcome exhibits from any collectors of cacti. Will members in Hampshire and adjacent areas please note the date and write to them for details.

SOUTH AFRICAN SUCCULENTS

By H. HERRE, of Stellenbosch, South Africa

South African succulents, like American cacti, are xerophytic plants, literally meaning "dry plants," but, more correctly, plants able to stand, more or less, long droughts. They belong to several Families and to many genera. Flowering plants are divided into two sections, the *Dicotyledonae* and the *Monocotyledonae*, that is, plants which, after germination, have two or only one seed lobes. Most succulents belong to the *Dicotyledonae*, while only a few, viz., the *Dioscoreaceae* and the *Liliaceae*, are *Monocotyledonae*. *Dicotyledonae* Families, alphabetically arranged, are: *Aizoaceae*, *Apocynaceae*, *Asclepiadaceae*, *Compositae*, *Crassulaceae*, *Euphorbiaceae*, *Geraniaceae*, *Mesembryanthemaceae*, *Pedaliaceae*, *Portulacaceae* and *Vitaceae*.

All succulent plants have, in common, a somewhat queer appearance which is so unlike ordinary plants, and it is largely for this reason that they are cultivated. Succulence may be shown in the leaves or the stems and enables them to store water in these parts of their bodies. Thus they swell up or in some other way change form and this variation is so interesting, funny, or out of the ordinary, that people who have a sense for forms are attracted by them and try to build up collections for study or for mere pleasure. The degree of succulence of the different plants is not always the same. Those which show it best are called high-succulent plants and these are the ones which are collected most eagerly. Many are classed as the so-called "mimicry" plants which means they adapt themselves so well to their environment, that they are only, with difficulty, seen among the stones and soil of their natural habitat. Collectors try, or at least ought to try, to imitate these conditions, otherwise they fail to achieve the full interest of their hobby. Sometimes, the flowers are, also, very beautiful as regards their form or colour, but there are others where the flowers are insignificantly small and without striking colours. Later on, when the different Families and genera are treated in more detail this fact will be indicated. All plants growing under dry conditions in countries with a surplus of sunshine are able to stand removal from the soil for quite a long time, without drying or too much damage. They generally grow well from cuttings and regenerate easily.

As we have seen, only two Families belong to the *Monocotyledonae* (plants with only one seed lobe), viz., all the grasses, palms and numerous other plants. The *Dioscoreaceae* are rank growing plants and *D. batatas*, or sweet potatoes, are the best known. The Latin name is, of course, after the Greek hero, Dioscorides. The only genus which interests us, as succulent lovers, is *Testudinaria*, literally meaning "tortoise plant." It is immediately recognised from all the other succulents as it shows above the soil a fairly big tuber with all the markings found on a tortoise shield. There are, at present, only two species; a bigger one which grows to a weight of many hundreds of pounds in the Cape Province and a more flat one from Natal and the Eastern Cape Province which lies on the soil. Both have male and female plants and the twigs climb up shrubs and trees. The leaves are somewhat heart-shaped and not too big. The flowers are small, greenish-white and form trusses, appearing from the axils of the leaves. The fruit of the female plant is a capsule which opens when ripe and the brown seeds have two wings enabling them to be carried away by the wind. There are, probably, more than two species in this genus.

The *Liliaceae*, the second of the *Monocotyledonae*, are, of course, all relatives of the lilies. The flowers of most of them are famous for the number six, because they generally have six sepals, six petals, six anthers and three stigma. In the best known genera of the succulent *Liliaceae*—*Aloes*, *Apicra* (now known as *Astroloba*), *Haworthias* and *Gasterias*, the petals are connected at their base and thus form a tube in which the anthers and stigmas are hidden. The other three genera, *Bowiea*, *Bulbine* and *Sansevieria*, have flowers looking more or less like the normal flowers of this Family. The fruits are capsules which open when ripe and dry, and the seeds, which are often black, are dispersed by the wind. Only the genus *Sansevieria* has berry-like fruits of more or less bright colour.

As regards the succulents belonging to the *Dicotyledonae*, we have to separate them into two large groups, the *Choripetalae*, where the petals are generally not connated, and the *Sympetalae*, where they are connated, and, sometimes, form a fairly long tube. As there is no rule without exceptions, we find among the *Choripetalae* flowers with petals slightly connated, as is the case with *Pleiospilos* and others.

Among the *Choripetalae* we first have the *Aizoaceae*, or as we now have to call this Family, the *Mesembryanthemaceae*. It is nearly a South African Family, and there are at present about one hundred and twenty genera with approximately three thousand species. Their flowers are characterised by the many petals and anthers and, also, for their marvellous fruits which range from the ordinary capsule, which splits when ripe as with some of the annual species, to the most intricate and wonderful capsule, with hygroscopic keels which cause the fruits to open when wet

and, in some cases, cell-wings and tubercles which cause the seeds to be dispersed only by heavy rains in order that they can be sown in the best conditions for germination. Besides annual species, there are small and high shrubs, rank growing plants, clump forming and high-succulent ones among this Family. There are also lots of mimicry plants, such as *Argyroderma*, *Didymotus*, *Lithops*, *Pleiospilos*, etc. It is, certainly, one of the most interesting of Families.

Next are the *Crassulaceae*. They also form small and high shrubs, but there are, also, clump-forming ones, and quite a lot of fine high-succulent ones which mimic their environment and, in consequence, are most interesting and in every way similar to the *Mesembryanthemaceae*. They are chiefly South African plants. There are twenty-five genera with about one thousand four hundred and fifty species. The flowers of all are joined in heads or in false-umbels, and some of them have an agreeable smell. The single flowers are, mostly, tiny to small, but there are others nearly as long as one's fingers. Like their leaves, they are very variable.

The *Euphorbiaceae*, or Spurge Family, comes next. There are two hundred and fifty genera with about four thousand species. Quite a lot are indigenous to South Africa. Sometimes it is difficult to decide, by appearance, if the plant is a cactus or a *Euphorbia*. There are shrubs, also trees, among them. With the exception of a few, most genera have milky juice or latex in their bodies, but it is of comparatively little use to man, at least in South Africa, and in some cases they are very poisonous. Nevertheless, there are some species which are used as food for cattle and stock in times of drought. Most significant of the features of this Family is the three-partite capsule and the flowers which are of peculiar form, called cyathium, which varies in many ways. The word literally means "flowering cup," and is well chosen for this sort of flower. The male and female flowers are clustered together and are protected by an encircling wall, called involucre. There are male and female flowers on different plants, sometimes on the same plant, and, sometimes, in the same flower. When the sexes are separated, I mostly found many more male than female plants. The flowers in one cyathium may lose something of their individuality, but the main parts will always be there. All are very small and it needs a magnifying glass to distinguish details. For the fertilising insect, the outside of the involucre contains the honey glands, sometimes finely coloured, as well as the lobes which have originated from the fusing of the ancient bracts. The honey has a very fine smell and attracts the insect perhaps more than the colour. Many of the different cyathia are very beautiful. This adds to the interest of various collectors of these plants in the same way as the interesting capsules of the *Mesembryanthemaceae*. Looked at carefully, much beauty and interest will be found which always gives an added impulse to collectors of these plants, encouraging the collection of more different types, in order to have the pleasure of examining them.

We regret to record the death of Miss Campbell, one of our pre-war members. It is noteworthy as Miss Campbell attained her hundredth birthday in July, 1947, and up to the last was keenly interested in her quite good collection of cacti.

Dr. H. W. de Boer, Molenweg 3, Haren (Gr), Holland, the well-known authority, has seeds of *Lithops Aucampiae*, *bella*, *Bromfeldii*, *Comptonii*, *Dinteri*, *Edithae*, *Elisabethae*, *Erniana*, *Fulleri*, *fulviceps*, *Framesii*, *floris albis*, *gracilidelineata*, *Herrei*, *Helmuthi*, *Julii*, *Karasmontana*, *kunjasensis*, *kuibisensis*, *localis*, *lactea*, *Lericheana*, *Halenbergense*, *lateritia*, *Lesliei*, *Mennellii*, *Marthae* (*inornata*), *mickbergensis*, *opalina*, *olivacea*, *Otzeniana*, *Peersii*, *pseudotruncatella*, *pulmonuncula*, *rugosa*, *salicola*, *Schwantesii*, *summitatum*, *Triebneri*, *terricolor*, *turbiniiformis*, *umdausensis*, *urikosensis*, *Vanzijlii*; *Dinteranthus puberulis*, *inexpectatus*; *Pleiospilos Bolusii*, *Hilmari*; *Frithia pulchra*; *Lapidaria Margaretae*; *Bijlia cana*; *Ophthalmophyllum Dinteri*, *Schlechteri*, which he would be willing to send in exchange for seeds of *Argyroderma*, *Gibbaeum* and *Ophthalmophyllum* species, also *Lithops aurantiaca*, *elevata*, *marmorata*, *Venteri*, *chrysocephala*, *Gulielmi*, *brevis*, *diutina*, *Franciscii*, *optica* var *rubra*, *translucens*. Readers interested should write Dr. de Boer direct.

The British Museum (Natural History), Cromwell Road, London, S.W.7, is anxious to complete their volumes of our Journal with those that cannot be supplied by the Society. Would any member willing to present or sell Volumes 1, 3, 6 and 7 to the Museum, please write them direct.

SUCCULENT FLOWERS IN WINTER

By G. G. GREEN

This is the time of the year to which most collectors of cacti and succulents have been looking forward. It means the end of a period of dull inactivity in the greenhouse and the beginning of that most pleasant phase of work which includes re-potting, seed sowing, re-arranging and so on. Especially will it be welcome to those of us who keep rigidly to cacti, for the last few months have been almost barren of blooms and brightness, and the main interest during these cold, bleak days has been in overcoming drips and damp and whatever preparation has been possible in the mixing of soils, cleaning of pots and general tidying up.

To those, however, who include succulents among their collection, I should imagine that not for some years has there been such a riotous display of colour and charm. The rather mild winter (compared with last year) has been very kind to these plants, and many readers will, no doubt, agree with me in saying that the winter flowering succulents have excelled themselves.

The most beautiful display I have seen was produced by the lowly *Bryophyllum tubiflorum*, whose large, pendant, cinnamon-orange coloured flowers hung gracefully in great profusion from 3 ft. stems. They began to open out the last week in December, and are still a sight to see, some of the "heads" being seven inches across.

It is surprising how dauntless these plants are! Some stragglers that were uprooted and flung under the staging persisted in flowering even under such harsh treatment as this and made one feel positively ashamed.

The other members of this delightful family, *B. Fedtschenkoi*, *crenatum*, *daigremontianum*, together with most of the *Kalanchoes*, have all been surprisingly profuse in flowering and have added a wonderful charm to the collection. *K. aleurodes* was grown outdoors from seed last year and potted up into 3½ inch pots during the last week in August. In October, they were transferred to 4 inch pots and grew to extraordinary fine bushy plants, their steel blue foliage covered in a fine silky bloom. There are very few plants that can compare in beauty of foliage with this, in my opinion.

Another long flowering species, the *Crassula argentea*, has borne its pink star-like flowers since December, and new heads are still forming on some plants which are only 9 inches or so in height.

I believe the best way to encourage blooms on this plant is to keep the soil fairly dry during summer and to let the foliage ripen in the sun out of doors, bringing the plants inside about the end of August.

Most people who saw the *Aloe arborescens* plants in full flower in January admired the "red hot poker" effect of the blooms and the comparison with the more common herbaceous plant is striking. They prove very decorative in brass bowls or vases in the house especially when used with the *Bryophyllums*—and remain fresh for weeks. For special occasions, I think sprays of *Bryophyllum*, *Kalanchoe*, *Crassula argentea* and the bronze-red foliage of *Kalanchoe granata* are very effective as table decoration.

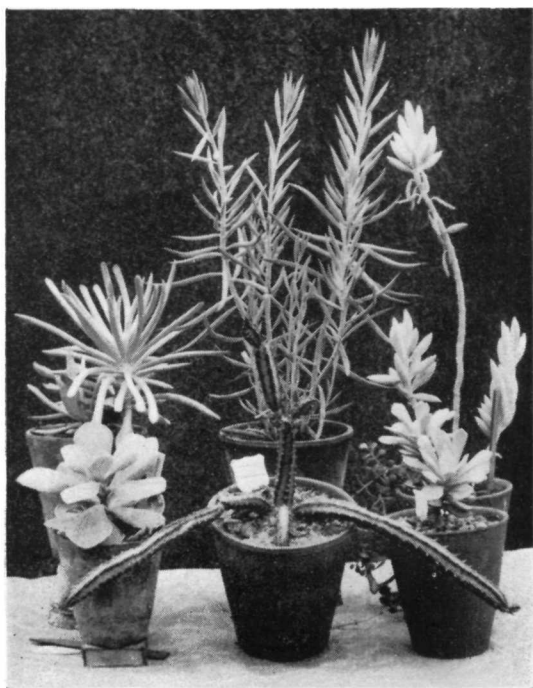
Aloes marlothii and *variegata* are now in full bloom and will last probably another month or so.

A. marlothii is a biennial flowerer with me, probably because the plant has been moved to a new position every two years. The leaves of this species are extremely brittle and break off at the slightest pressure.

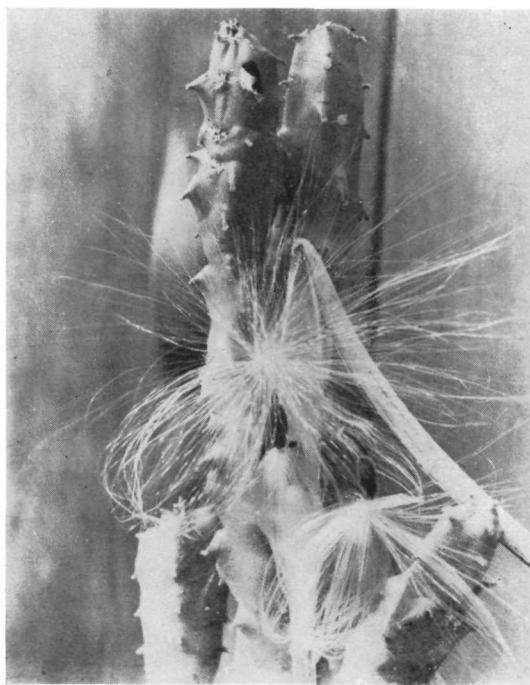
The *Kleinias* have nearly all flowered and though the composite formation of the flowers is not at all striking, the massed effect among the *Kalanchoes* has helped to improve the general picture. *Kleinia odora* was cut down last August because the stems were touching the glass roof. I used a few of the thicker cuttings as grafting stock for *Senecio stapeliiformis* and have some interesting results. This latter plant is very prone to rotting when given too much water, and grafting is a good way of growing the species, as, when in flower, the orange-red composite flowers stand up on long stems giving a candelabra-like effect to the whole. I notice that some authors describe the colour of this plant's flower as yellow which is quite erroneous. The new grafts, made in August, are now showing healthy signs of growth and will be strong plants this year, giving me the usual two flowering periods.

Kleinia pendula with similar growth and flowers to the foregoing has been kept very dry during the winter and is now pushing up new shoots from beneath the loose gravelly mixture in which they are planted. Water will be given carefully during the next week or so.

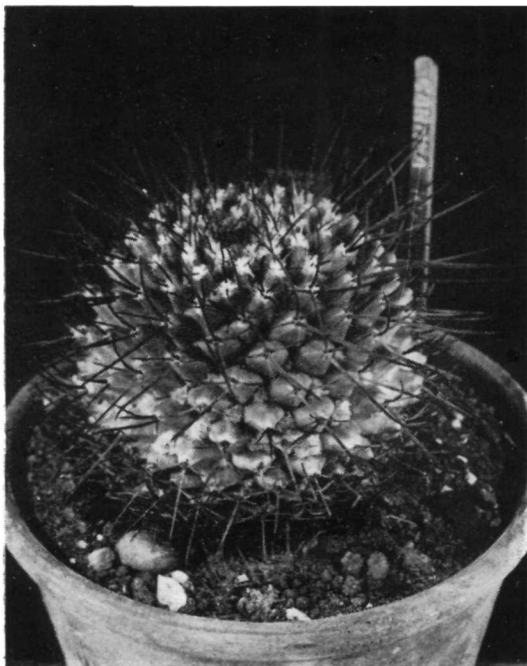
That pretty trailer, *Ceropegia Woodii*, has hardly ever been without flowers since the day it first came into my possession, and the few that are used as hanging specimens from baskets have been profusely free with their pinky, queer shaped blooms. They like partial shade and a fair amount of water in winter as well as summer, with a rich very porous soil. *C. dichotomum* has also flowered this winter and is now stopped growing. The skeleton-like stems are losing the long leaves and will soon be in the resting stage.

*Senecios*

G. G. Green

*Caralluma europea*

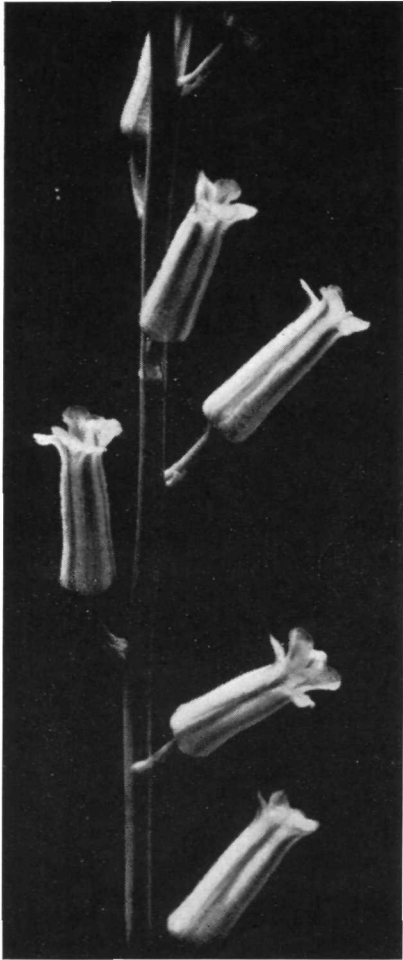
G. G. Green

*Mammillaria carnea*

E. Shurly

*Trichodiadema densum*

H. Jacobsen



Haworthia flowers A. J. A. Uitewaal



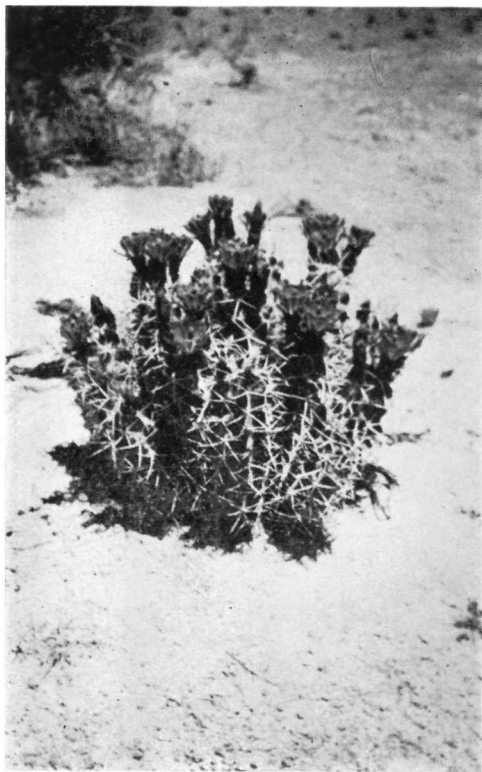
Gasteria caespitosa A. J. A. Uitewaal



Astroloba pentagona spiralis
A. J. A. Uitewaal

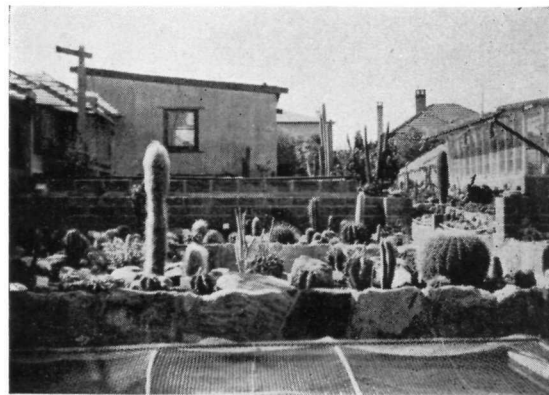


What is it ? A. J. A. Uitewaal
(*Othonna Herrei*—Ed. !)



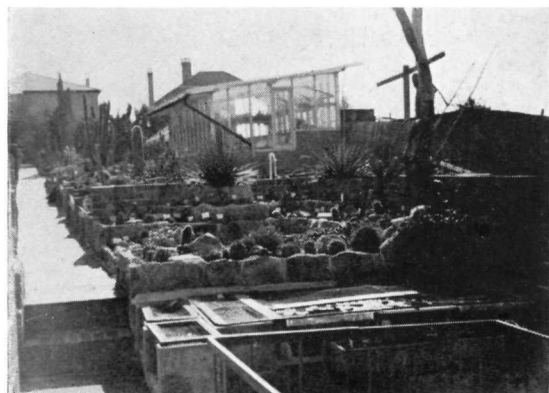
Echinocereus triglochidiatus

Mrs. Mikelson



Cacti in Australia

L. O. Ollason



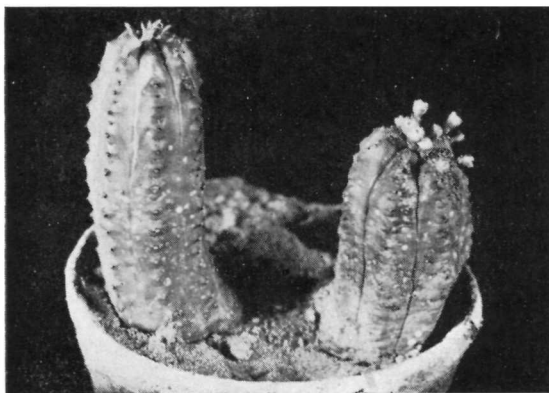
Cactus in Australia

L. O. Ollason



Ferocactus wislizenii

Mrs. Mikelson



Euphorbia pseudoglobosa

J. A. Janse



Conophytum Group

G. G. Green



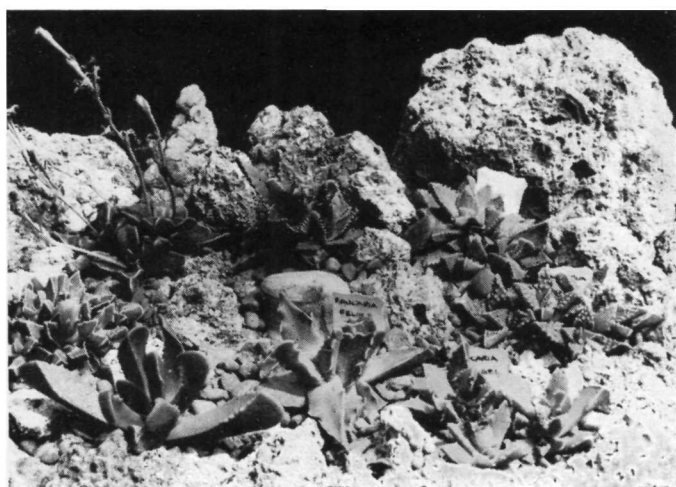
Conophytum Group

G. G. Green



Echinocereus stramineus

Mrs. Mikelson



Rhombophyllums, *Carruanthus* and *Faucarias*

G. G. Green

The silver leaved *Senecios-medley-woodii*, *vestita*, *scaposus* and *fulgens*—have flowered also, and are now making new growth and showing the beautiful, shining white felt between the old leaves. These *Senecios* require a certain amount of water during the winter, though I always pick a bright day to do this, but when plunged in a mixture of gravel and leafmould they can usually get sufficient moisture from below without the need of watering the pots.

There has been a plentiful supply of flowers among the *Echeveria* group and the blooms of *E. pulvinata* were especially bright. The contrast between the silvery hairs and the vivid red-orange flowers being quite remarkable. *Echeverias* are fascinating plants, I think, as the colour change of foliage during the winter months is most interesting, especially when the plants are kept on the dry side. *E. gibb* ; var *metallica* has a beautiful metallic shade of red, and *elegans* has the delightful pink transparent edge to the leaves. There will be a busy time ahead potting up the leaf cuttings which have filled the boxes with new rosettes. I shall propagate *Urbinia agavoides* at the end of April, sowing the dusty seed amongst the cuttings of *Ceropegia dichotomum* which will be placed in the cold frame in boxes. This always seems to me the best way of growing *Echeveria* seed, as the partial shade and close atmosphere is just right, and they don't take up unnecessary room in the greenhouse. By the time the cuttings are rooted sufficiently to pot up, the seedlings are big enough to prick out.

Amongst the *Bromeliads*, *Hechtia texensis* and *Dyckia sulphurea* have thrown up numerous off-shoots and need larger pots. These members of the pineapple family are most interesting and beautiful, but prove difficult to handle when re-potting. I wrap them round with soft rags, use a leather glove and pot in rich, porous compost as they are gross feeders.

I was lucky enough to have most of my *Stapelias* form seed pods last year and managed to photograph one just bursting (see accompanying photograph). Though this phenomenon is manifest all around us in summer amongst our own wild plant life, the act itself in the greenhouse seems more marvellous when it occurs on a treasured succulent. The seeds appear much too heavy to be supported as they are, but they float majestically about in the slightest breeze. They have been sown in a mixture of peat and sand and will probably germinate within the next few days.

Sedum treleasii and *pachyphytoides* are showing yellow star-shaped blooms, and placed as they are amongst *Crassulas lactea* and *marginatus*, blend very effectively with the pinky-white and white flowers of the latter. I was astonished to find *Sedum hirsutum* growing wild on the rocky walls of Somerset last August, when I was down there on holiday. It is the only place in this country where I've ever heard of it growing wild, and I wonder how it ever came to make its home there, though, perhaps, some readers may have come across it elsewhere. It certainly looked quite at home and had formed quite big cushions amongst the rocks.

I noticed that *Bulbine caulescens* has begun to flower much earlier than last year. The feathery yellow flowers are very pretty but do not last very long, maybe a week or so, but seeds are plentiful, and I have managed to raise a nice batch of young plants from seed sown last August.

It was apparent that one panful of these had been watered a great deal through being placed near a crack in the glass where the rain had constantly blown in.

These seedlings are now much bigger than the others that have been kept under the usual routine, which rather suggests they, too, could have done with more moisture during winter. However, it's too much of a risk to give *Bulbines* water in the cold months, and I don't think I will make it a regular part of the culture.

I hope others, amongst lovers of succulents, have had such pleasure as I have had during the winter, and that success has crowned their efforts at propagation and culture of the more unusual species.

Amongst such an enormous family there is ample scope for individual choice, and with such rewards for the slight trouble in rearing and cultivation, succulents will always provide colour and charm even in the most miserable of winter days.

Mr. A. Boarder, the Exchange Secretary, rightly raps the editor over the knuckle by "There is a bit of a mix up in the note re exchanges in the Journal. Members who write to me re exchanges are supplied by me with the names and addresses of others willing to exchange and they write to them themselves. If I had to write to every exchange every time I heard of a fresh one, I should have to write up up to fifteen or sixteen members every time." The Editor duly apologises and trusts the above extract now puts the matter clearly.

EUPHORBIA PSEUDOGLOBOSA Marl.

By J. A. JANSE, F.R.H.S., Hillegom (Holland)

Euph. pseudoglobosa Marl in S. Afr. Gard. 19, p 191 (1929) ; Cact & Succ Journal of Am, 1, p 188 (1930) ; Euph Monogr 2, p 533 (1941) ; Jacobsen, Succ Pl 90 (1946) ; *E. Frickiana* N.E.Br in C & S Journal 2 ; 491 (1931), id in Succulenta 13 ; 133 (1931).

This small species is one of the most interesting of the newer succulent *Euphorbiae*. Although it was discovered twenty years ago, it is still a rather rare occurrence in our collections.

Its specific name indicates a certain resemblance to the very well-known and widely distributed *E. globosa*, a resemblance, however, which is only a very superficial one, the stems being distinctly angled and not tessellately tubercled as in that species.

The short, crowded stems, 5—7 cm. (1—1½ inches) high, globular at first, becoming more cylindric or elongated afterwards, spring from a joint, tuberous taproot, which is wholly buried in the soil. Generally they have 5—7, not very prominent angles with blunt tubercles, separated by more or less distinct transversal grooves, the angles themselves separated by an impressed, vertical line.

Habit and growth are somewhat variable, there is also some difference between male and female plants, the latter sometimes being more cylindric in general outline. Usually the plants are totally spineless, but some plants have been found with a few persistent remains of the short peduncles, specimens have been described by N. E. Brown as a distinct species and named *E. Frickiana*, but comparing it with *E. pseudo-globosa* there is, apart from these scarcely occurring persistent peduncles, but a very slight difference, if any.

In Europe, in any case, my plants flower during winter. I think they belong to that type of extreme succulents which rest during the dry and hot summer, and do not show any growth before a period with some moisture has set in. This periodicity in growth may be a hint to its cultivation. Do not try to force it by excessive watering, the only result will be a rotting base and no growth at all. As soon as the plant shows the beginning of its growing season, usually September or October, we may give a regular but careful watering ; on rainy days, not



unusual these months, it is better not to water.

E. pseudoglobosa is a dioecious species, thus producing male and female cyathia on separate plants. In both sexes they are almost sessile or very shortly peduncled and crowded at the top of the stems. There is some difference in shape between male and female cyathia which are clearly shown in our figure. The male cyathium has a broad campanulate involucre, with conspicuous bright green glands. The involucre of the female one is much more slender, the bracts surrounding it also more lanceolate. Dissecting a female cyathium, I found some dried remains of anthers, which, therefore, seem to have been initiated in an early stage of development. Dyer mentions, that in a related species *E. juglans*, generally a reduced pistillate flower may be found in male cyathia, which is never observed with *E. pseudoglobosa*.

The habitat of *E. pseudoglobosa* is restricted to the Little Karoo, the type locality is the Riversdale district, but other specimens have been collected in the Montagu, Ladysmith and Swellendam districts.

We are given to understand that the credit for the photograph of *Pseudorhipsalis macrantha*, published in the January number should be credited to T. MacDougall.

HAWORTHIA AND ASTROLOBA (Apicra)

By R. S. FARDEN

After growing a rather large collection of succulents (which included cacti), I have to say, that of all the genera, I have found these two by far the most interesting, and continually so, because of the definite and distinct arrangement of the tubercles on the leaves, also because the plants are so difficult to obtain.

They grow on and around the Great Karoo Desert, a little north of Cape Town ; they are extremely local, hardly any two species are to be found in the same area, which makes it especially difficult for collectors to obtain a good quantity of specimens in one journey.

There is only one publication on the two genera and that is fifty years old and was written by Baker of Kew Gardens, under the title of "Flora Capensis," Vol. VI ; it is scarce today and sells at two guineas. In this book he described 86 species of *Haworthias* and nine *Apicras*. I wrote for myself a book in which I described 220 *Haworthias* and 15 *Apicras*. There is a separate page for every specimen with a life-size drawing and full description of each plant, the pictures were copied from plants in my collection. It is now in the library of the Royal Horticultural Society, where it can be seen. It is, of course, still in manuscript.

The flowers of *Haworthias* are all identical, they are white with three petals standing upwards and three pointing downwards.

The *Apicra* flowers are cream, with much smaller petals and grow in a circle.

Mr. Uitewaal, of Amsterdam, has just re-named the *Apicras*, because he has found the name given by Duval was quite untenable in botany, he has, therefore, named it *Astroloba*. Incidentally, he has just acquired a very nice new variety and has named it after me. The plant is, therefore, *Astroloba egregia fardeniana*.

When I found that Wilhelm Triebner of Windhoek, S.W. Africa, was finding several new species, I gave him an open order to send me, every six months, specimens of his new discoveries, and by that means my collection arose to something over five hundred plants, and I confined myself to two plants of a kind. My collection is now at Kew.

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 our dear old departed friend, 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 named them and published the list in our Cactus Journal of December, 1939.

One may ask where can specimens of these genera be found today. I suspect that you will not find more than five species in any dealer's stock in all Europe. The only chance of finding more is at Hurling & Niel of Bonnie Vale, Cape Colony, and W. Triebner of Windhoek, who both issued catalogues before the war.

From Newell & Wilson, Surrey Hills, Australia. "Regarding native succulents ; the *Hoya* Mrs. Campbell mentioned is native to the northern tropical forest areas, its range covering most of the East Indies in addition. This plant is a succulent creeper with waxy leaves, and most beautifully perfumed waxy "everlasting" flowers. There is only one other native succulent—this being *Anacampseros australis*, but this is never seen in cultivation, even here. Australia has very large areas similar in climate to the great cactus deserts of America, but our deserts are apparently of recent geographical origin and their flora is confined to tough, drought resistant grasses and vivid flowers which germinate, bloom and die in a few days after the infrequent rains. The Southern States have a temperate climate which seems to favour the growth of cacti far more than does the constant tropical humidity of the northern areas. Queensland gets rain for weeks on end with the humidity remaining near saturation point. For this reason, the major Australian collections are located in Victoria, New South Wales, and South Australia. Victorian conditions are quite good for cactus growing. Here in Melbourne, we have approximately 30" rainfall

[continued at foot of p. 47]

CYTOLOGICAL RESEARCH OF THE MESEMBRYANTHEMACEAE

By H. D. WULFF

In a recent number of this Journal (Vol 9 : 4 : 1947), O. Hoevel expressed the opinion that cytological research had not yet dealt with the *Mesembryanthemaceae*, particularly *Lithops*. This is certainly not the case, even if they belong to a plant Family that has been very little investigated cytologically. The main reasons are as follows :—

1. Systematic and thorough investigation of this Family only began three decades ago and the confusion originating from its many re-classifications would deter anybody not familiar with them. Very recently, however, G. Schwantes (System der *Mesembryanthemaceae*, Sukkulantenkunde I : 34—40, 1947), arranged the many species of the Family, which had fallen into a chaos not easy to disentangle, into Sub-tribes, Tribes and Sub-Families and, consequently, the cytologist might now feel tempted to employ his methods.

2. The chromosome numbers of altogether sixty-four species, published by various authors between 1931 and 1940, were rather monotonous, and did not encourage further cytological investigation of the Family. We know that the basic number nine is preponderant in this Family ; only one species with the number ten has been known to date. Also polyploid species, having a multiple of the basic number nine, are comparatively rare (about 33% of the species). Finally, the chromosomes do not show any considerable differences with regard to their shapes and sizes so far as we can judge for the time being. It can be scarcely recommended to use the *Mesembryanthemaceae* for cytological research in a similar way, as formerly, to other Families, in that one has to build up from samples of the whole Family.

Things being as they are, it appears to be more promising to begin first with " details " and to start cytological research of the *Mesembryanthemaceae* with individual genera or with individual Sub-tribes at the most. There is no doubt that the systematic classification of the Family has not been finished by the system of Schwantes. Everybody interested in this Family will ask what affinities and phylogenetic connections exist between the individual genera of a Sub-tribe or the individual species of a genus. I believe to have shown in my investigation into the *Gibbaeinae* Schwant. that cytology can give valuable hints in this respect. (H. D. Wulff, Untersuchungen zur Zytologie und Systematik der *Aizoaceen*-Subtribus *Gibbaeinae* Schwant. Bot. Archiv. Vol. 45 : 149—189 : 1944.)

I shall give only two examples here : *Gibbaeum perviride* (Haw.) N.E.Br. and *Gibbaeum luteoviride* (Haw.) N.E.Br. are two species so extremely similar to each other that N. E. Brown temporarily considered *Gibbaeum luteoviride* to be a variety of *Gibbaeum perviride*. The chromosome numbers of these two species are $2n=18$ for *Gibbaeum perviride* and $2n=36$ for *Gibbaeum luteoviride*. Without doubt, these different chromosome numbers justify considering *Gibbaeum luteoviride* as an individual species, as N. E. Brown eventually did, particularly with regard to the not too frequent occurrence of polyploidy within the genus.

A second case : *Gibbaeum pubescens* (Haw.) N.E.Br., *Gibbaeum Shandii* N.E.Br. and *Gibbaeum geminum* N.E.Br. show,—it is true there is a considerable difference in size—strong habitual similarities from which one may conclude that close affinities must exist between the three species. Cytological analysis is the only objective measure that can state what they are ; *Gibbaeum pubescens* must be considered as the phylogenetically eldest of the three species, as it is diploid ($2n=18$), *Gibbaeum Shandii* tetraploid ($2n=36$) and *Gibbaeum geminum* hexaploid ($2n=54$).

But if a larger group of species of a genus is to be examined with regard to their mutual relationship, and a systematic classification of the genera be attempted, external habitats and cytological characteristics alone are insufficient to decide whether the suspected phylogenetic development is reflected in the systematic classification, which is the object of Systematics. In order not to become a victim of the phenomena of convergence, which is easily possible with regard to *Mesembryanthemaceae*, it is absolutely necessary to consider as many characteristics as possible.

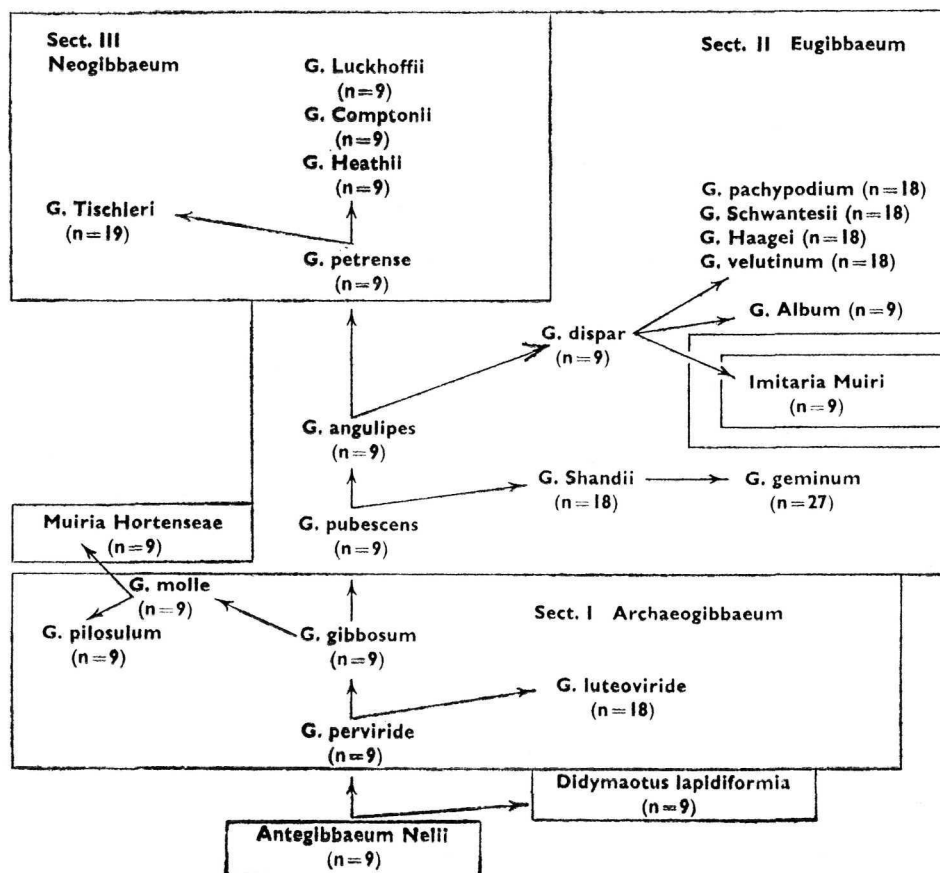
The selection of easily seen characteristics in *Mesembryanthemaceae* is comparatively small. In the case of *Gibbaeinae*, examined by myself, the furring of the leaves was found to be a third characteristic worth while being considered. The form of hairs are extraordinarily constant so they play a great role in important sections of botany (e.g., the identification of drugs and vegetables occurring in the form of powder). With the help of the three characters : chromosome number and shape, form of leaves and form of hairs, I have tried to clear up the phylogenetic relations between the individual representatives of *Gibbaeinae*. The results are put forward again for discussion in the following scheme (it has to be emphasised that out of the twenty-five species of *Gibbaeinae* known at the present time, five could not be considered owing to lack of material).

The arrows in the Family tree do not mean a direct descent between the species connected by them, but only express a suspected intimate relationship. Apart from this, there has been a change with regard to the scheme

published in my paper (as quoted above), in so far as the name of the species called then *Gibbaeum spec. nov.* is called now *Gibbaeum Haagei* Schwant. (In *Beitrage zur Sukkulentenkunde und-pflege* III : 89 : 1938), while the species called then *Gibbaeum Haagei* Schwant. (H. Jacobsen, *Succulent Plants* 179 : 1935) has to be changed now into *Gibbaeum Tischleri* (to be published elsewhere)).

Finally, attention may be drawn to a cytologic peculiarity of *Mesembryanthemaceae* (which they share with other leaf succulents). The leaves of *Mesembryanthemaceae* are succulent because they contain water storing tissue. The cells and cell-nuclei in this tissue are extraordinarily enlarged in contrast to those in the epidermis of the leaf. An accurate examination of *Gibbaeum Heathii* (N.E.Br.) L.Bol. showed, in agreement with findings of L. Geitler (Die Polyploidie der Dauergewebe hoherer Pflanzen, *Berichte d. deutsch. bot. Ges.* Vol 58 : 131—142 : 1940), who described, for the first time, something similar for the water tissue in the leaf of *Rhoeo discolor*, that these large nuclei are polyploid. In *Gibbaeum Heathii* the polyploidy of the nuclei could only be decided from their finer structure, viz., the increased numbers of chromocentres. The experimental division of the nuclei has yet to be accomplished in order to define exactly their chromosome numbers. But such polyploid nuclei, which owe their origin to an "endomiosis," are not only found in the water cells of the leaf, but also in the periblem of the root where they have been noticed several times in the closely related *Chenopodiaceae*. In *Gibbaeum Heathii* I succeeded in demonstrating the polyploidy, or more accurately the tetraploidy, by accurate counts of the chromosomes in the dividing nuclei of this tissue.

My examinations of the *Gibbaeinae* were the first attempt to cytologically investigate the *Mesembryanthemaceae*. I may be allowed to say that the result has been encouraging enough to justify the continuation of the examination of the Family by cytological methods. Work had been started on the genus *Lithops* before the war. Unfortunately, the collected material was lost through the events of the war, so that a new attempt has now to be made.



ANNUAL GENERAL MEETING

17th February, 1948

The meeting opened with an expression of regret at the news that our Chairman, Mr. P. V. Collings, was in hospital seriously ill. Mr. Boarder was elected Chairman of the meeting. (Mr. Collings is now making good progress, and it is hoped that he will have resumed his activities by the time this is being read).

The minutes of the last Annual General Meeting were read and approved.

The Honorary Secretary reported on the Society's activities during 1947, and pointed out that good progress had been made, and that measures proposed for 1948, including two Exhibitions, should make for further progress.

The Honorary Treasurer presented the accounts for 1947 and, after a discussion, they were adopted unanimously, and a vote of thanks passed to Miss Mackenzie for the work done during the year.

The Editor stated that he had no report to make as the Journal was, in itself, his report; he had received many compliments on the Journal, and the only complaint seemed to be that it was not big enough, nor appeared frequently enough! A special request was made for an article on the hardy *Sempervivums*. (This request has been answered in this issue.)

The Exchange Secretary (Mr. A. Boarder) reported on the satisfactory number of exchanges during the year, but drew attention of beginners how easy it was to fall into the unfortunate mistake of expecting a very valuable plant for offsets of some easily grown plant. Mr. Boarder had received more seeds which were then distributed at the meeting. He wished to thank the various societies and others who had contributed seeds for distribution to the members. Thanks were expressed to Mr. Boarder for the work done in the distribution of the seeds, and it was fully realised the amount of work involved in splitting up fruits, especially *Mesembryanthemaceae*, making up packets and despatching.

The Earl of Mansfield was then re-elected President.

Major A. A. Dorrien Smith and Mrs. Vera Higgins were elected Vice-Presidents.

Mr. C. H. Rowland and Miss H. Mackenzie were re-elected Honorary Secretary and Honorary Treasurer respectively.

Miss E. Fergusson Kelly and Messrs. W. Denton, S. J. Pullen, E. Shurly, K. H. Walden, H. J. Aylott, A. Boarder, P. V. Collings and A. J. Edwards were elected to serve as the Council for 1948.

A resolution "That Mr. R. S. Farden be elected Permanent Honorary Vice-President" was carried unanimously. The honour was conferred in recognition of the very fine work done by Mr. Farden as Chairman of the Council from the inception of the Society to the outbreak of the war, in addition to his many other activities that have so benefited the knowledge of our subject.

Details were given of proposals received from the Swiss and Dutch Cactus Societies for a European Cactus Society. After a lengthy discussion, the meeting asked that a translation should be circulated to the members, together with a voting form so that the matter could be decided and the Council were instructed to act in accordance with the result of the ballot.

Details of a coming trip to the Bolivian Andes by Miss W. M. A. Brooke were given and a number of members signified their interest in the project. It was decided that details should be sent to those interested when the necessary information was ready. Members not able to attend the A.G.M., but who are interested in the proposal, and the consequent distribution of cacti, should send their names and addresses to the Editor who will see they are notified in due course. The only suggestion at present under consideration is the contribution of equal amounts by members interested and they, of course, would equally share in the Cacti sent back by Miss Brooke, but pot-luck would have to be reckoned upon.

Mr. Vivian, of 50 Waterloo Road, Wellington, Somerset, was kind enough to offer packets of 75/100 seeds of *Astrophytum asterias*, *ornatum* and *myriostigma*, *Echinocactus Grusonii* and also mixed seeds for distribution to members, and those interested are requested to communicate direct with Mr. Vivian (it would be best if those interested enclosed cost of postage with their letters).

THE CACTUS AND SUCCULENT SOCIETY OF GREAT BRITAIN

Income and Expenditure Account for the year ended 31st December, 1947

INCOME		EXPENDITURE	
	£ s. d.		£ s. d.
Cash in hand	75 3 2	Hire of Hall	10 12 9
Advertisements (Journal)	60 4 6	Engraving Cups	5 6
Sale of Journals	23 17 11	Printing (Ratcliff & Corving)	32 17 0
Overseas Subscriptions	41 2 6	Printing Journal (Strange)	288 17 8
Subscriptions	241 4 8	Postages	32 1 4
Sundries	2 0	Petty Cash	5 0 0
Refund from Mr. Shurly	4 5 6	Returned Subscriptions	1 9 0
		Advertising	14 11 3
		Exhibition Expenses	6 4 6
		Balance in Hand	54 1 3
	<u>£446 0 3</u>		<u>£446 0 3</u>

Balance in hand	54 1 3
1948 Subscriptions paid in advance	39 7 6
Balance as shown in Bank pass book	<u>£93 8 9</u>

Signed H. MACKENZIE, Hon. Treasurer.
Audited and found correct, C. F. NAYLOR.

REPORTS OF MEETINGS

March 16th, 1948. Mr. A. Boarder : Cacti and Succulents from seed.

Mr. Boarder commenced with the query whether it was worth while growing plants from seed and, in his opinion, it was well worth while, as growing from seed enabled collectors to obtain plants perfect in every way and an improvement on imported plants that had to be severed from their native rocks with the main roots damaged, packed in darkness and suffering from the long transit ; it was doubtful if plants imported before the war were still alive.

He had built up another collection from seed germinated since the war.

To successfully raise plants, seeds should be sown in the best conditions and the seedlings grown on with the utmost care. Sow seeds in half pots or pans, but do not use zinc or wood containers ; the containers can be divided for separate species, but do not sow different genera in the same pot owing to the varying times for germination.

Soak pots for four days before using and sterilise with a permanganate of potash solution. If possible, use a frame heated, tubular lamps very suitable, with a temperature, controlled thermostatically, of 70 degrees. As to soil, John Innes compost was the best as sterilising the soil yourself is troublesome and usually not very effective. The soil in which to germinate seed could be equal parts of bacterised peat, loam and sharp, coarse sand, with a little powdered chalk and also a little superphosphate. Fill the bottom of the container with charcoal, broken brick for drainage, add the coarsest of your compost, from sieving, on top and continue with finer and finer soil until for the top half inch you get the finest, but leave half an inch from the top of the container for watering. Name or number the sections occupied by the species in pencil on the side of the pot as labels would get in the way of glass to be put on the top of the pots.

Sow the seed. The finest seeds can be dusted on to the soil from the tip of a spoon and then pressed down with something like the bottom of a jam jar, but larger seeds must be buried to a depth equal to their size. Before sowing, however, thoroughly soak the soil in the containers for an hour or two, drain off until the soil is just damp—the ideal is a ball of soil that will cohere in a ball in the hands without soiling the hands. After sowing, cover each container with a square of glass which must be shaded with whitewash or a piece of newspaper until the seeds have germinated, when the shading is gradually removed. You do not water again until the seedlings are up, which will be in five to ten days. Cheshunt solution is a good preventive of damping off, but subsequent water used needs also to be sterilised with a mild solution of permanganate of potash.

When the seedlings appear, raise the glass from the containers by inserting a match stick under one side to give air, and increase this space gradually until after about ten days the glass can be removed entirely provided the frame is kept in a shady spot and not in direct sunshine. If all the seeds have not germinated it is advisable to take this course after ten days because it is better to make sure of those seedlings that are up than pamper those yet to come. Once the seedlings are up you can overhead spray them. Be sure the jet is gentle, practically vapour, or you will wash them out. Do not overdo watering, watch your containers carefully and never let them dry completely out, but keep in just a slightly damp state and never let the top soil cake ; if in doubt take the old cactus advice—don't water as if there is a doubt it is certain they do not need watering. Watering is an art which is the secret of fine plants. No hard and fast rules can be laid down on the subject as conditions vary so much, each collector must learn by his own experience, all we can do is to give general hints. It may be found that when the weather is fine and warm the pots can do with a daily spray, but do not water or spray in damp and foggy weather or you will lose your plants.

Sow early so that your plants have all the summer to develop and be in a condition to face the coming winter. If you have heat you can sow seeds any time, but never sow them later than July if your plants are to attain stamina. With cacti you transplant when the plants show their first spines ; transplant into larger pots and keep the plants growing by transplanting into larger and larger pots to keep pace with the growth of the roots. Keep your plants growing and it is a fallacy to keep plants in pots too small to permit root development. Succulents are easier to germinate and grow than cacti. Do not transplant seedlings or plants after September.

Mr. J. A. Janse, of Loosterweg 3/1, Hillegom, Holland, desires to acquire Volume 1, part 2 of Volume 3 and part 2 of Volume 7 of our Journal. He is willing to exchange with *Euphorbias* or the complete 1946 Volume of the American Cactus Journal. Those interested please write Mr. Janse direct (in English).



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Exchanges : A. Boarder, Marsworth, Meadway, Ruislip, Middlesex.

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

6 p.m.

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SOCIETY NEWS

Meetings : April 13th : Discussion on Exhibition Classes.

May 4th : P. V. Collings—Pests.

May 29th : Visit to Kew.

June 8th : Exhibition.

Discussion on Exhibition.

July 6th : Novices' Evening.

The meeting on July 6th is to give the novice an opportunity to ventilate his points of view, challenge those more experienced and, in general, put the officers on the "carpet." Speakers to be given up to ten minutes each.

The Treasurer wants to know if you have paid your subscription? If not, please send it to the Treasurer without delay or you will not be getting the Journal. Also if you have paid your subscription and have not received your membership card or badge, let the Treasurer know.

The Librarian reports plenty of activity during the winter. The thanks of the society are given to Miss Scopes for the contribution of "Mammillaria Handbook" by Dr. R. T. Craig, and to Mr. Wood, of Stockport, for "What Kinda Cactus Izzat" by Reg Manning.

We still want to hear from provincial members if they are willing to co-operate in the formation and management of Branches.

continued from p. 41]

per annum, we recorded only one frost last winter and snow has never fallen locally while temperatures of 100 degrees are quite frequent in summer, and as this is never accompanied by persistent humidity our growing season is ideal. We can flower the vast majority of species very freely—some of the *Opuntias* being rather difficult. *Ferocactus latispinus* is the only one of this group to flower in Melbourne, Feros being of very slow growth here. *Echinocactus Grusonii* has been flowered in South Australia but we have no record of it in Melbourne, and this would seem to be the only member of the *Echinocactus* section to bloom in Australia. Northern Victoria, north of the Great Dividing Range is even more fortunate climatically than Melbourne, as many growers in places like Bendigo and Mildura grow all species out of doors without cover throughout the year. *Pilocerei* are their one difficulty, the heavy frosts proving fatal to them, but they can flower the majority of Feros out of doors."

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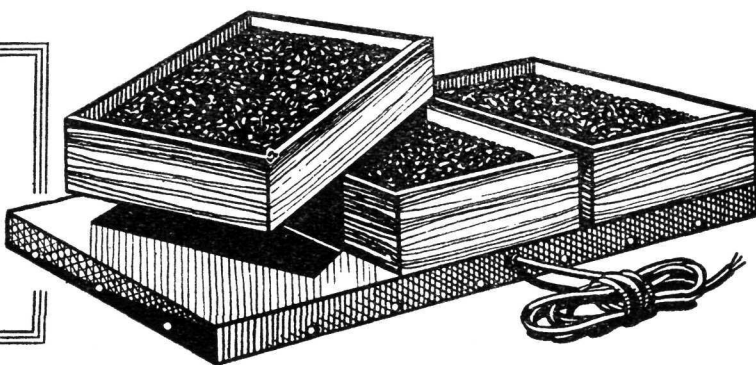
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THE CACTUS AND SUCCULENT JOURNAL OF GREAT BRITAIN

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JULY, 1948

No. 3

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EDITORIAL

At last, the vote on the proposals of the Swiss and Dutch Societies, in regard to a European Cactus Society, has been concluded, and there is an overwhelming majority in favour of the Dutch proposals; 69 against 2! It has been a distasteful matter to handle and we much regret the necessity for it, especially if it causes hard feelings in certain quarters. It can only be hoped that they will endeavour to see it from our point of view, as it was more a matter of principle than of personalities. We still look to them, and they can look to us, for the fullest co-operation in other matters.

Having thankfully disposed of that unfortunate matter, we were entitled to have a period of calm and it is, therefore, all the more to be regretted that we are the subject of a bitter attack on the part of Mr. Roan which was completely unnecessary and un-called for. It is dealt with on another page.

To turn to happier affairs. We have the pleasure of welcoming still another post-war Empire cactus publication. We refer to the Journal of the New Zealand Cactus Society. At present, it is mimeographed, but as time and membership allows, it will join its printed brethren. Notwithstanding, the contents are extremely interesting and thought-provoking and, if they can keep up the quality, their Journal will be a valuable contribution to cactus literature. We were specially intrigued by J. W. A., who makes some very original remarks in regard to the cultivation of our plants; also Tony Alexander who gives some very interesting matter on the farming of mealy bugs by ants.

A member suggests that it might be interesting to know something about the personalities of the Society. Editorial opinion has been that members want to know about plants and not about persons, but if sufficient think otherwise, this can be arranged.

On this hopeful note, we will conclude and trust that the quarter ahead of us will keep free from things that are sent to try us, and that it may be remarkable for a newer and better state of feeling on, and from, all sides.

Professor G. C. Nel's eagerly awaited book "*Lithops*" has arrived. The edition is limited so get your copy before supplies run out.

It is a book of 178 pages, printed in English and Afrikaans. It deals with fifty species and has 127 black and white figures and 57 coloured plates, a total of 182, an average of nearly four illustrations to each species—a generous allowance that helps identification.

The first part efficiently deals with stem, leaf, window, margin, also with geographical distribution, mimicry, the problem of determining species. Finally, there is a comprehensive key of the genus and a bibliography. Descriptions are extensive, accompanied by much interesting material on each species. It is a book that is a credit to the talented author and is a highly valuable contribution to our knowledge of the genus.

(The Editor has three copies for disposal. Remittance of £5 5s. 0d. per copy should be sent to E. Shurly, 7 Deacons Hill Road, Elstree, Herts.)

CULTURAL NOTES

By A. BOARDER

At this time of the year we should be able to see the results of our earlier repotting and to admire all the flowers which I hope have appeared. You will doubtless have noticed that some of your plants have made exceptional growth whereas others seem to have made no new growth at all. It often happens so, and in a group of seedling plants one or two will often go ahead of the others, and while some grow steadily, others hardly grow at all. One plant may have just the right conditions in the pot to induce good growth whilst another which has apparently had the same treatment is very reluctant to make any new growth at all. This may be due to several factors. The fibrous roots of the plant may have been badly damaged in repotting and if the plant has been watered too soon, the root system may have been unable to take in any of the moisture with the result that the roots may have rotted.

When this happens it will be a long time before the plant can make any fresh growth, and if it is not treated correctly the plant may die. The drainage may also be at fault. This is not always due to insufficient crocks in the pot, but the soil itself may not be porous enough. It may be that the roots of the plant were dead before repotting took place and in this case it is quite possible that the plant will not grow at all if it is watered too soon. Where a plant's roots do not seem healthy when it is repotted it is a good plan to re-root the plant in some sharp sand before you actually repot it. This is a good procedure when dealing with a plant which has not made any new growth for some time or has been in the same pot for at least two years.

If a plant has been so long without repotting, it is almost certain that the small fibrous roots, those which do all the work, will have died and this is the chief reason why plants do not grow and flower. In cultural notes in books on growing Cacti, written years ago, it was generally stated that Cacti needed to be pot-bound before they would flower. I disagree entirely with this statement, and am certain that such writings have done considerable harm to the hobby of growing Cacti, and many people must have been discouraged from growing Cacti by the lack of healthy growth and flowers. The trouble has also been that many following writers have simply copied all that has been said in previous books without having gone to the trouble of experimenting to see if these earlier statements were true.

To prove my statement I should like to quote the following experience. I raised a hybrid *Lobivia* from seed sown in about June, 1946. This plant was potted on in good soil as often as it needed it, and was not at any time allowed to become pot-bound. In consequence today, this plant in May, 1948, is three inches across and two and three-quarter inches high, exclusive of spines. It is almost globular, just slightly depressed at the top. It is a splendid specimen for two years old, and what is more it has already flowered. There were three grand flowers, creamy white, with brownish-green sepals, about six inches high and four and a half wide. The flowers were very similar to the flower of an *Echinopsis* except that the spreading sepals were more like the flower of a night-flowering *Cereus*. The flowers had the usual large number of stamens and had a beautiful perfume, a sweet scent similar to that of lime trees in bloom. Although these three flowers developed at apparently the same rate they opened separately, one after the other and each lasting just over a day. The seed pods appear to be developing, but it is rather early to be sure of this. I consider that this plant is a perfect specimen, and I can say quite definitely that it has never been pot-bound and what is more, it has never been actually dried right out during the winter.

I am certain that if this plant had been kept in one pot all the time, it would not have grown to more than one-quarter its present size, and it would not have flowered. I have taken this plant to more than one Society meeting and those members who were able to see it will probably remember what it was like.

The plant described is not just one exception as several other species have made excellent growth and have also flowered. A *Mammillaria centricirrha hopferiana* is now three-and-a-quarter inches wide and two-and-a-half inches high, exclusive of spines, and it is only two years old from seed. This plant has also flowered, and is a very healthy specimen. I have also had a two-year old *Rebutia minuscula* with about forty flowers and this plant is two-and-a-half inches across. A seedling *Rebutia violaciflora* of about eighteen months from time of sowing is now one-and-three-quarter inches wide and has also flowered.

I have described the rate of growth of these plants to try to make clear to members many points which I often stress with regard to the correct growing of these plants. They can only be grown well by using good potting soil, watering correctly, and potting on whenever necessary. The sooner it is realised that Cacti will respond to decent treatment and are not the museum fossils that many people imagine, and what some writers would have us believe, then the sooner will there be more beautiful collections and many more enthusiasts in the hobby.

I have several more plants which have flowered very well, all no more than two years old from seed, and some succulents other than Cacti have flowered such as :—*Schwantesia Rudebuschi*, *Glottiphyllum longum* and *Dinteranthus microsperma*. Besides the Cacti which I have mentioned I have flowered : *Mammillarias Wildii*, *bocasana*, *bocasana*

flavisplina, *Kunziana*, *Schelhassei*, *pygmaea*, *multihamata*, *mercadensis*, *Seideliana*, *compressa*, *Viereckii*, *erythrosperma*, *pusilla* and varieties, and *Coryphantha cubensis*. This last plant is rather remarkable, it is quite new to me, and, although only about a year old, and three-quarters of an inch across, it has already had several flowers, each at least three-eighths of an inch wide. The flowers all come from the top centre of the plant and it can easily be realised how remarkable the plant looks with two or three flowers out at the same time. One or two more of the same species have also flowered although they are smaller and still in the seed pricking-out box.

As I wrote before, I did not shade my greenhouse at all last year, and I have not done so this season, with the exception of the very small seedlings in the propagating frame which has the covering glass slightly shaded with white-wash. This sunshine is most important for the successful growing of Cacti and I have just had a very good example of this. I mentioned in previous notes that a plant would never grow good spines without sunshine, and if members could see a plant I have of *Cereus grandiflora* it would be apparent immediately what effect the sun has had on this plant. It is a seedling which for some years now has been one of the occupants in a small bowl garden in my daughter's living room. It had become very spindly and had hardly any spines worth mentioning, and was about as thick as a pencil. As it looked tall and weedy and out of place in the bowl I exchanged it for a *Mammillaria* and potted it up in my usual mixture. It has now grown a new shoot from near its base and this is quite twice as thick as the old part and the spines are four times as large and are very strong; no one would ever recognise the two pieces, if they were parted, as having come from the same plant. The ends of the old piece are now growing and the new growth is very much stronger than the old. It looks quite a different plant, which proves my point that sunshine is absolutely necessary for the proper development of spines and flowers. Many Cacti which are grown in a room will look different species from those which have been grown in a sunny greenhouse.

If you wish to take any cuttings of your plants I advise you to do so as soon as possible, as the new roots form much more quickly when there is plenty of power in the sun. If you have any seedlings which you wish to transplant it is well to do this as soon as you can. Leaving them until September is taking too much of a risk, of course unless you will be able to give them a good growing temperature all the winter.

I have experimented this year by transplanting some of my young seedlings into half-pots, four inches across, the same kinds as I use for seed raising. I find that it is easier to treat the plants this way as about a dozen or so may be placed in one pot, which can then be given the right treatment, which may not be possible for all the occupants of a very much larger seed box with its probable two hundred plantlets. The seedlings which I have so planted are making good growth, and appear to be growing better than others in a seed box. When next moved these plants will be potted individually into two inch pots, the Long Toms, I think they are called. These are very deep in comparison with their width and so provide good root space.

Remember at this time of the year to give plenty of air to the greenhouse. It is only by so doing can you leave the glass unshaded. It is far safer to have too much air in the house than not enough. It is amazing how soon a greenhouse can reach the hundreds in temperature, when the sun is shining brightly even in the early mornings if the ventilators are not open. Do not be afraid to spray your plants well after a hot day and as soon as you shut down for the night. In the hottest part of the summer you need not shut down completely, but towards the autumn it is advisable to close down just before the sun leaves the house. This is rather like telling someone to take the pill half an hour before the pain comes on, but you can at least see when the sun has nearly left the greenhouse. If you leave closing down even for a short time after the sun has left, it is surprising how much heat can escape through the top ventilators. At this time of the year try to retain as much heat as possible throughout the night, and do not keep opening and shutting the door any more than you can help.

Those members who like scented flowers will do well to grow *Mam. camptotricha* and *M. viereckii*; the former flowers are almost pure white but are very strongly scented whilst the latter are pinkish white, small but so sweetly scented that a few will fill the greenhouse with perfume during a sunny spell. The *Notocactus* group are mainly large flowered and very showy but not scented. *N. ottonis* has just had nine grand blooms and with the brilliant shiny petals and the red pistil it is indeed a fine plant. A seedling *N. mamulosa* has also had about ten flowers and these are also yellow but no so vivid as the former plant. These plants will hardly ever open without fairly strong sunlight.

During the summer months many of your succulents will benefit greatly by being placed outdoors where they may be left in a rather sheltered position well into September. Many Cacti will also like this treatment, but it is rather dangerous to put out good specimens as slugs and snails may do damage which will mar the plant for years. I think that it is safer to keep all the best Cacti indoors all the year and give the greenhouse as much air as possible at all suitable times. If you do place the plants outside, see that they are placed on a good bed of clinkers or ashes as otherwise the drainage holes may become clogged up with the subsequent loss of porosity of the soil in the pot. There is also the possibility of worms making their way up into the pot; but these can easily be cleared out when the plants are brought inside again by watering with a fairly strong solution of permanganate of potash; the worms will soon come out and the plants will be unharmed.

“Notes for Beginners”

SOME MORPHOLOGICAL ASPECTS OF SUCCULENT EUPHORBIAE (Part II)

By J. A. JANSE, F.R.H.S. (Hillegom, Holland)

Systematic investigations, in the field, of succulent plants of the last 25 years have led to splitting up into small genera of our large groups. The Cactus Family, divided into twenty or more large genera in the 19th century, now contains nearly 150 smaller genera, each based upon a special type, and even beginners are familiar with the more easily recognisable types. The *Mesembryanthemaceae*, formerly treated as an almost unsurveyable group of quite heterogenous types, is now divided into a large number of smaller genera which have found acceptance with collectors and amateurs.

It is, therefore, remarkable that the almost too large genus, *Euphorbia*, containing some 1,300 species, has not yet undergone the same fate. The only reason is the uniformity of the floral characters, which, in spite of some remarkable morphological aspects, do not differ enough to justify a division into separate genera.

Haworth was the first to establish new genera (*Medusea*, *Treisia* and *Dactylanthes*), but later authors reduced them to sub-generic rank, notwithstanding, they erected a number of new sub-genera (*Anthacantha* Lem ; *Diacanthium*, *Tithymalus* and *Tirucalli* Boissier ; *Pseudeuphorbium* Pax ; *Pteroneuræ* and *Pseudomedusea* Berger, etc.). The inflorescence of *Euphorbia* were considered by botanists of the 17th and 18th century as single flowers, with which they have a deceiving resemblance.

The inflorescence of *Euphorbia*, generally known as a Cyathium, consists of a central female flower surrounded by a number of male flowers, enclosed by an involucre, thus performing the same function as the perianth of a normal flower (Fig. 3). Female, as well as male flowers, do not bear calyx or corolla, so, examining a cyathium for the first time, one may easily confuse it with an ordinary flower, but looking more carefully at the male flowers, the stamen is seen to stand on a short pedicel (Fig. 2). In a related genus from Senegambia, *Anthostema*, the stamen is surrounded by a minute perianth (Fig. 1) which is wanting in *Euphorbia*. Male flowers are, more or less, clearly arranged in five groups, each group being a minute cluster. Female flowers consist of an often-stalked ovary, three-celled, with three styles, for a shorter or longer part united into a column, but with three free stigmas with bifid tips. In some species, the pedicel-bearing the female flower is so long that the flower is wholly exerted from the involucre and, in this case, the involucre, sometimes, has only four glands, the space of the fifth being filled by the pedicel of the drooping female flower (Fig. b). The involucre is cup-shaped, hence Cyathium (Greek; kyathos—cup). On its margin five lobes and five glands or nectaries alternate. These glands may have a very different shape. In the section *Medusea* Haw. and *Pseudomedusea* Berg. its outer margin bears teeth-like processes or is, at least, clearly dentate. In *Medusea*, the cyathia are borne at the tips of the side branches, in *Pseudomedusea*, they are developed at their base. *E. breviflora*, a rare species from Klipplaat, bears involucre glands with an entire margin, but with a deep central cavity ; its cyathia are borne on peduncles at the tips of the short side branches (Figs. a and e). Generally, the outline of the glands is ovate, sub-ovate or reniform and its upper part horizontally spreading (Figs. b and f), sometimes, however, they are more erect and narrow as seen from above (Fig. d) ; in some species they touch each other (contiguous), in others, they are free (non-contiguous).

Curious glands are found in the section *Dactylanthes* Haw. (*E. globosa*, *tridentata*, *ornithopus*). Here, the glands are bi-labiate with a short upper lip and a broad under lip with long teeth-like processes, beautifully marked with irregular white lines (Fig. c).

Observation during flowering time shows that, in many species, male flowers develop earlier than the central female flower, undoubtedly a measure to prevent self-pollination.

Plants with complete (bi-sexual) cyathia are monoecious, but there are also dioecious species with separate male and female plants ; often one observes correlative characters in the vegetative parts, male and female plants being of considerable difference.

In the section *Diacanthium*, the cyathia, being an inflorescence in itself, are arranged in clusters, a central male cyathium with one bi-sexual on either side. The central male cyathium flowers first, followed by the lateral ones.

Undoubtedly, the cyathium has the definite function of ensuring the reproduction of the species in the same way as an ordinary flower. Glands producing nectar may attract insects and, consequently, pollination may take place, but the cyathia, being quite inconspicuous, do not attract by their colouring ; in some species, however, bracts surrounding the cyathium have taken over the task fulfilled by the perianth of a normal flower ; they are larger and brightly coloured, red or purple. Good examples are *E. splendens*, *Bojeri* and *Hislopii* from Madagascar and *E. atropurpurea* from Canary Islands.

EXHIBITION : June, 1948

The Schedules for the 1948 Shows have been much revised and improved by suggestions made at the meeting of April 13th.

There were over one hundred entries, an increase of 50%. Members took more notice of the advice given by Mr. Boarder, and plants were superior to those previously shown. It must be stressed, however, that exhibitors should carefully go over their plants, clean them, and the pots, prepare soil, etc., for future Shows. One entry was disqualified as plants did not belong to the Class. The results were :—

- Class 1 (Three *Echinocactaceae*) : 1st P. V. Collings ; 2nd, Miss E. M. Chambers ; 3rd, Miss D. M. Poore ; Commended, R. H. West. One specially well-grown *Astrophytum myriostigma* was outstanding, but the class was not up to the standard to be expected.
- Class 2 (Three *Coryphanthaceae*) : 1st, K. H. Walden ; 2nd, E. Shurly ; 3rd, P. V. Collings ; Very highly commended, Mrs. Shurly ; Highly commended, S. J. Pullen ; Commended, Mrs. M. Stillwell.
- Class 3 (Three *Cereaceae*) : 1st, P. V. Collings ; 2nd, Mrs. M. Stillwell ; 3rd, R. H. West.
- Class 4 (Three *Echinocereaceae*) : 1st, R. H. West ; 2nd, Miss E. M. Chambers ; 3rd, Miss D. M. Poore. An *Echinocereus pectinatus rufispinus* had a rufus body, but off-shoot was white with purplish-red spines at growing point ; also an unusually very white *Echinocereus pectinatus*.
- Class 5 (Three cacti) : 1st, S. J. Pullen ; 2nd, P. V. Collings ; 3rd, K. H. Walden ; Very highly commended, E. L. Wyman ; Highly commended, R. H. West ; Commended, Mrs. M. Stillwell. Won by three good, rare cacti.
- Class 6 (One specimen cactus) : 1st, P. V. Collings ; 2nd, K. H. Walden ; 3rd, S. J. Pullen ; Highly commended, R. H. West. Won by a well-grown *Astrophytum myriostigma*. It had four fading flowers and six buds.
- Class 7 (Cacti seedlings less than three years old) : 1st, not awarded ; 2nd, R. H. West ; 3rd, K. H. Walden. Not up to standard for first award. Disappointing as, after three years, should have been better.
- Class 8 (Cacti seedlings more than three years old) : 1st, K. H. Walden ; 2nd, R. H. West ; 3rd, Mrs. S. J. Cutler ; Commended, Miss D. M. Poore.
- Class 9 (Miniature garden) : 1st, H. N. Judd ; 2nd, G. Berlemont ; 3rd, no award ; Commended, H. J. Aylott.
- Class 10 (Three *Mesembryanthemums*) : 1st, Capt. H. J. Dunne Cooke ; 2nd, P. V. Collings ; 3rd, S. J. Pullen ; Commended, Mrs. M. Stillwell. A close win, but rarer plants decided the issue.
- Class 11 (Three *Haworthias*, *Gasterias* and/or *Aloes*) : 1st, Capt. H. J. Dunne Cooke ; 2nd, Mrs. E. Shurly ; 3rd, H. N. Judd ; Commended, H. J. Aylott.
- Class 12 (Three *Euphorbias*) : 1st, H. J. Aylott ; 2nd, S. J. Pullen ; 3rd, Mrs. M. Stillwell ; Commended, Capt. H. J. Dunne Cooke. Second lost because of one indifferent plant.
- Class 13 (Three succulents other than cacti) : 1st, Capt. H. J. Dunne Cooke ; 2nd, S. J. Pullen ; 3rd, P. V. Collings ; Commended, Mrs. M. Stillwell. Won clearly by quality and rarity of plants.
- Class 14 (Succulent seedlings less than three years old) : 1st, no award ; 2nd, H. N. Judd. Only one entry ; not considered good enough for first place.
- Class 15 (Succulent seedlings more than three years old) : 1st, W. Denton ; 2nd, Capt. H. J. Dunne Cooke. Two entries. A superb display of fine, clean plants.
- Class 16 (Six succulents and/or cacti) : 1st, Capt. H. J. Dunne Cooke ; 2nd, E. Shurly ; 3rd, K. H. Walden ; Very highly commended, Miss M. R. Lawrence.
- Class 17 (Beginners, not previously won an award. Three cacti) : 1st, Mrs. M. Stillwell ; 2nd, Mrs. M. E. Hawkins ; 3rd, S. F. Milton ; Commended, Miss D. Hawkins. Won by good, clean, carefully chosen plants.
- Class 18 (Beginners, not previously won an award. Three succulents) : 1st, Mrs. M. Stillwell ; 2nd, Miss D. Hawkins ; 3rd, Mrs. M. E. Hawkins ; Commended, S. F. Milton.
- Class 19 (Three cacti and/or succulents grown in living rooms) : 1st, no award ; 2nd, G. Berlemont. One entry, not considered good enough for first place. Surprising members cultivating plant in living rooms did not take advantage of this new class.

Mrs. V. Higgins and Mr. A. Boarder were the judges and are to be congratulated on very fair and exceedingly competent awards.

Thanks are due to Mr. K. H. Walden who gave up his holiday to supervise and arrange the exhibit. The lay-out and general presentation of the Show was of the highest quality and a credit to all who took part.

Photographs were taken, but it is doubtful whether it is possible to get them through in time for this issue, but, if possible, they will be included in the October number of the Journal.

NEW PLANTS

The Allan Hancock Foundation of California has just published a report by Mr. E. Yale Dawson on his expedition to Mexico from October, 1946, to February, 1947.

The booklet contains a great deal of interesting information in regard to plants already published—*Pereskia Conzattii*; *Pachycereus columna-trajani*; *Cephalocereus tetetzo*, *mezcalaensis*, *Collinsii* and *chrysacanthus*; *Pachycereus grandis*; *Lemaireocereus euphorbioides*, *Dumortieri*, *stellatus*, *pruinosis*, *chende*, *chichi*, *montanus*; *Escotria chiotilla*; *Myrtillocactus Schenkii*; *Nyctocereus oaxacensis*; *Cactus oaxacensis*; *Acanthocereus horridus*, with illustrations in all but four instances.

Mr. Dawson describes three new *Cephalocereus* and one *Lemaireocereus*, and with Dr. R. E. Craig two *Mammillarias* with varieties. We give below the descriptions of the plants, but the booklet also gives much other useful information which space prevents us from quoting.

Cephalocereus apicicephalum sp. nov.

Plants 1.5—3 m. high, dull bluish green, simple or more commonly branched from the very base, with a few to ten suberect, simple stems occasionally branched above through injury, 6.5—10 cm. in diam., somewhat annulately constricted; ribs 22—27, 6—9 mm. high; pseudocephalum well developed, terminal, encircling the upper 2—4 cm. on the apex of the main branches, with abundant, white, woolly hairs forming at the very terminus, a conspicuous cottony tuft falling away completely within two years; areoles elliptical, not at all woolly below the pseudocephalum, becoming dark, dull brown with age; radial spines about 12, slender, bristle like, irregularly curved or slightly twisted, 2—3 cm. long from lower part of areole and less than 1 cm. from upper; central spines 2—6, one prominent, nearly straight, stiffer than the radials, 2—4 cm. long, deflexed, the others very short, from the upper portion of areole; flowers small, 2—2.5 cm. long, arising in a ring in the pseudocephalum; the dry perianth tubes often remaining for 1—3 years after fall of pseudocephalial wool; perianth tube bearing a few scattered scales with slightly woolly axils. Type from lava cliffs and hills 17 km. west of Tehuantepec, Oaxaca.

Cephalocereus nudus sp. nov.

Plants 1.5—2.5 m. (sometimes 4 m.) high, bright yellow-green, simple or sparingly branched from above the base, 9—10 cm. in diam., unstricted; ribs 14, about 1 cm. high, rounded; areoles ovate, large, 5.5—6 mm. in long. diam., widely separated, usually 3—3.5 cm.; spines very few, usually but a single acicular radial, strongly deflexed and about 1.5 cm. long from the lowermost part of the areole, occasionally with one or two other shorter radials slightly above and on either side of the first; pseudocephalum absent; flowering areoles essentially like the vegetative ones; flowers and fruits unknown. Type from lava cliffs and hills 17 km. west of Tehuantepec, Oaxaca.

Cephalocereus quadricentralis sp. nov.

Plants to 5 m. high or more, with a trunk 25 cm. in diam.; primary branching from 50—150 cm. above the base, giving rise to about 10 slender limbs with little or no secondary branching; branches 7—8 cm. in diam. above commonly with 9 prominent ribs, heavily spined, with a dense mass of long wool in the terminal region; wool at first white, soon becoming gray and dirty, falling away a few cm. below the apex on one side and persistent on the other to form a lateral pseudocephalum in which the flowers are borne; areoles ovate, 5 mm. in longitudinal diameter, closely approximate in terminal region, but usually 1.5—1.7 cm. apart below, virtually nude after fall of the wool, without felt; spines a lustreless reddish-brown at first, very early becoming dull gray and mottled, acicular and conspicuously bulbous at the base; radials 11—13, 10—20 cm. long, widely spreading; centrals usually four, divergent, 20—30 or 35 mm. long; flowers and fruits unknown. Type collected in open brush land at about 1000 m. elevation, just east of the Oaxaca-Chiapas border on the Pan-Pacific Highway.

Lemaireocereus setispinus sp. nov.

Plants arborescent, to 6 m. high, abundantly branched from a short, heavy trunk; branches sharply ascending, of 3—4 orders, 8—10 cm. in diam., with 19—24 ribs about 1.2 cm. high; areoles slightly elevated on the ribs, about 2 cm. apart on juvenile branches, about 1.2 cm. apart on mature, flowering branches, small on juvenile parts, about 2.5 mm. diam., larger, to 4 mm. diam., on mature parts, with a dense tuft of gray felt; spines black, acicular and mostly straight on juvenile parts, bristle-like and usually curved or somewhat twisted on mature parts; radials 3—5 on juvenile parts, 10—15 mm. long, 8—10 on mature parts, the lower ones to 3 cm. long, the upper 1.5 cm.

long or less ; central spines 1, like the radials but a little longer ; flowers and fruits unknown. Type at base of volcanic hill a few kilometers east of Juchitan, Oaxaca, near sea level on the Isthmus of Tehuantepec.

Mammillaria nejapensis sp. nov. var. *typica* var. nov.

Body mostly caespitose from the base, deep seated, ovoid to clavate, 5—7.5 cm. wide, to 15 cm. high, with somewhat sunken apex ; tubercles closely set in 13—21 spirals, firm in texture, 5—8 mm. long, 6—8 mm. wide at base, with milky sap ; areoles pyriform in outline, small, sunken, with scant white wool only in youth ; axils with many tortuous white bristles, longer than and nearly hiding the tubercles, but only those in the upper part of the plant with scant white wool ; central spines none ; radial spines 3—5, mostly 4, of variable length with the upper ones shorter (2—5 mm. long) and the lowermost longest (to 25 mm. long) all acicular, but the lower heavier, all straight to slightly curved, smooth, stiff, not enlarged at the base, white with reddish-brown at the very tip, upper ones ascending dorsally and lower one descending ventrally ; flowers in cultivation opening in May, arising near the top of the plant, 18 mm. long, 10 mm. wide, funnel form ; outer perianth segments very pale greenish-white below, to terra cotta (pale brownish-red) tapering mid-stripe above, with pale cream margins, linear lanceolate, with elongated acuminate tips and ciliated margins ; inner perianth segments terra cotta to scarlet mid-line with wide pale cream margins, lanceolate, with elongated acuminate tips and entire margins ; anthers dirty yellow ; filaments white below to pale pink at the top ; style white ; stigma lobes 4—5, pale green, 1 mm. long, just overtopping anthers ; fruit with dried perianth persisting, bright red, slender clavate, 20 mm. long, 6 mm. wide ; seeds pale amber, 1.2 by 0.5 mm. in principal dimensions, ovoid to pyriform, with lateral hilum near the base, faintly wrinkled. Type among igneous rocks in limestone gorge of the Rio Totolapan, 10—15 km. north-west of Nejapa, Oaxaca.

Mammillaria nejapensis var. *brevispina* var. nov.

Spines 2—4 mm. long.

Mammillaria nejapensis var. *longispina* var. nov.

Upper spines 4—10 mm. long, the lower one to 5 mm. long.

Mammillaria duoformis sp. nov. var. *typica* var. nov.

Body cylindric, simple, sometimes branching from base, to 9 cm. high, 3.5 cm. wide ; tubercles covered by spines, arranged in 13—21 spiral series, firm in texture, dark bluish green, blunt-conic, not angled, keeled ventrally, with watery or semi-milky sap, 5—6 mm. long, 5 mm. wide at base ; areoles oval, with very scant tan wool only in the youngest ; axils with bristles ; central spines 4, spreading in cross formation, 10—12 mm. long, smooth, stiff, with slightly enlarged bases, pinkish tan below, becoming black above, upper 3 straight, lower one longer, darker than the upper, stout acicular, usually strongly hooked but sometimes straight (see variety) ; radial spines 18—20, 5—7 mm. long, slender acicular, straight, smooth, stiff, not enlarged at base, pale yellow becoming chalky-white, orange tan at very base so as to form a ring of colour around the areole, horizontally spreading ; flowers appearing in July and August (in cultivation) open for several days, lateral near the top, bell-shaped, 15 mm. long, 12 mm. wide ; outer perianth segments very pale green below to reddish-brown on the mid-stripe above, with pink to orange tan margins, lanceolate, with acute tips and ciliated margins ; inner perianth segments bright crimson, linear lanceolate, with acuminate tips and entire margins, anthers pale chalky-yellow ; filaments white ; style white ; stigma lobes 4, greenish-yellow, slender, less than 1 mm. long, just overtopping anthers ; fruit with dried perianth persisting, brownish-pink, clavate, 18 mm. long, 4 mm. wide ; seeds brown, 1.3 by 0.8 mm., with lateral hilum near base, pitted ; roots fibrous. Type on dry, exposed lava hill slope of southern exposure along the Puebla-Oaxaca highway near Tehuiztingo, Puebla.

Mammillaria duoformis var. *rectiformis* var. nov.

Like the typical species, but with all the central spines straight.

In the illustration pages will be seen a very fine photograph of *Mammillaria gracilis* by Dr. E. Elkan. The point about the photograph, in addition to its excellence, is that it is very rare to see the plant in flower and rarer still to see it published with the flower.

CONOPHYTUM N.E. BR.

By H. HERRE

This genus, with 260 species and twelve varieties, follows *Ruschia* in quantity and contains many kinds that will not be found again because of insufficient descriptions, i.e., flower or fruit descriptions missing and, in many cases, we do not even know where they come from. Therefore, we must accept a lesser number than has been actually published, but in spite of this, there still remain enough to make it second in number to *Ruschia*.

Dispersion stretches from southern South-West Africa to the neighbourhood of Cape Town and from there eastwards to Willowmore. Most grow in the vicinity of the coast, but some species are found at Pofadder and Kakamas and even near Beaufort West. They mostly have yellow flowers, others white and pink ones and only very few dark red.

In order to separate the large number of species, they are divided into thirteen sub-divisions, but for our purpose two are sufficient, because they are, more or less, natural groups :—

1. *Eu-conophytum* (Greek : eu=genuine, true).
2. *Biloba* (Greek : two lobes) because the points of the two leaves, of which the cone-shaped plant is composed, are very clearly seen as they spread, while in *Eu-conophytum* the body really is and always stays cone-shaped, i.e., the surface or top is flat or a little convex with a more or less long or broad slit between the two leaves which is often not easily seen.

Species of the *Biloba* group are found mostly in Namaqualand and there are very few growing further south. *Eu-conophytum* species, on the other hand, are mainly found in the Karroo, but are also found in Namaqualand and South-West Africa. There are more of them than in the *Biloba* group. While the free parts of the lobes of *Biloba* group are sometimes beautifully undulated and the margins of the leaves are often reddish in colour, they lack, generally, the spots or dots which give a beauty of their own to the lobes of many of the *Eu-conophytum* group. Most of the flowers are yellow, but some have white, pink or purplish-red flowers.

During their resting period they, of course, greatly resemble one another, because, in both groups, the old leaves dry away and protect the young leaves forming underneath, so that they are surrounded by a paper-like sheath, hiding the beauty of the new leaves. Collectors in Europe, U.S.A., etc., find them unattractive at this stage. When the winter rains come, the green leaves appear and some of the species flower, while others flower in mid-winter or towards springtime.

Reproduction through cuttings should take place immediately after the resting period. Capsules must be removed as soon as they are ripe, otherwise the seeds are washed away by the first rains.

Cultivation : they like some shade and grow best in crevices or between stones and rocks or under bushes, etc. They never grow during summer. When they rest and are hidden under the old white sheaths, collectors are advised to plant them in pots, tins, etc., and put them in soil under frames with the glass whitewashed during the hot summer, so that they will not be burnt. They will then grow excellently ; on an ordinary rockery they do not always get the right places, as some get too much sun and others too little and thus very few grow well.

It is, of course, impossible to discuss here all the species, but the most important and prettiest ones will be treated.

I. *Eu-conophytum*

Species with hairy bodies.

C. Bolusiae Schw. (in honour of Dr. L. Bolus). Blue green with a few dots. Knersvlakte between v. Rhynsdorp and Nieuwe Rust.

C. Stephanii Schw. (in honour of P. Stephan, Hamburg). Small, yellowish flowers. Kinderle near Steinkopf, Namaqualand.

Those species, of which the medium to small bodies are completely covered with small but visible hairs, are very seldom found in collections because they are rare and, besides, they are very difficult to cultivate as they prefer to grow on decomposed rocks. Up till now, only these two species have been found.

Species with very small bodies with, more or less, dots on the lobes.

There are not many species and it is strange that most of them produce such beautiful flowers which are of the same size as those of the larger species. They are mostly beautiful pink or red with a yellowish or whitish inside.

C. Herrei Schw. (Named for the author). Gifberg, v. Rhynsdorp. Grows on decomposed rocks. Flower violet-red, yellowish inside.

C. reticulatum L. Bol. (Net-like nerves). Pakhuispass, Clanwilliam. Habit and flower is nearly the same as *C. Herrei*.

C. minusculum N.E. Br. (Fairly small). Between Clanwilliam and Citrusdale. Similar to the previous two, perhaps they are all the same or varieties of one species.

C. calitzdorpense L. Bol. Calitzdorp. Flowers meat to cream coloured.

C. catervum N.E. Br. (Dots running ray-like from split). Laingsburg. Flower cream.

- C. fraternum* N.E. Br. (Brotherly, fraternal). Southern Richtersveld. Flower pink.
C. Leightoniae L. Bol. (in honour of-Miss F. M. Leighton). Between Ladismith and Montagu. Flowers pink.
C. Muirii N.E. Br. (in honour of Dr. J. Muir). Little Karroo ; Muiskraal, Barrydale district, Touwsberg. Flowers pink to whitish.
C. occultum L. Bol. (Hidden). South of Ritterfontein. Night flowering, light yellow.
C. pubicalyx Lavis (hairy calyx). Nieuwefontein, v. Rhynsdorp district. Flowers during night, nearly red. Perhaps the *Conophytum* with the smallest body. Calyx hairy (puberulent) and this occurs very rarely.
C. saxetanum N.E. Br. (occurring on rocks). Luderitzbucht, Kovies Mts., S.W.A. Flowers whitish and very small. Lives fifty years and more !

Species nicely painted on the lobes, caused by dark spots running together.

- C. pictum* N.E. Br. (painted). Graafwater, Clanwilliam and Calvinia. Flowers whitish.
C. picturatum N.E. Br. (gay coloured). Between Clanwilliam and Citrusdale. Flower (?)
C. spectabile Lavis (worth looking at). Worcester. Perhaps the most beautiful of all. Flowers pink with a fine fruit-like scent.
C. Wiggettae N.E. Br. (in honour of Mrs. Wiggett). Hazenjacht, Oudtshoorn. Spots do not run together. Flowers white.

Species with dark coloured spots and dots. Bodies often reddish.

- C. ceresianum* L. Bol. Ceres Karroo. Night flowering, yellowish to meat.
C. declinatum L. Bol. (bent downward). Clanwilliam. Night flowering, white.
C. ficiforme (Haw.) N.E. Br. (fig-like). Worcester. Lobes light green, flowers pink.
C. flavum N.E. Br. (pure yellow). Steinkopf. Flowers pure yellow.
C. halenbergense (Dtr et Schw.) N.E. Br. Halenberg, S.W.A. Flowers meat.
C. Joubertii Lavis (in honour of A. J. Joubert, Ladismith). v. Wyksdorp, Ladismith. Flowers light yellow.
C. Lambertense Schick et Tisch. Lambertsbay, Clanwilliam. Flowers whitish.
C. leptanthum L. Bol. (thin flowers). Between Garcia Pass and Barrydale. Flowers (?)
C. lutea N.E. Br. (yellow). Namaqualand. Flowers yellow.
C. meleagris L. Bol. (guinea fowl-like dots). Nieuwefontein, district v. Rhynsdorp. Night flowering, light yellow.
C. minutum (Haw.) N.E. Br. (very small). Bakhuis, v. Rhynsdorp. Flowers pale red.
C. multipunctatum Tisch. (many spots). Unionsdale district. Flowers yellowish.
C. mundum N.E. Br. (neat, elegant). Clanwilliam. Flowers yellowish.
C. Nevillei (Sims) N.E. Br. (in honour of Neville S. Pillans). Between Clanwilliam and v. Rhynsdorp. Flowers whitish to yellow.
C. obcordellum (Haw.) N.E. Br. (inverted heart shaped). Worcester. Flowers whitish.
C. ovatum Lavis (egg shaped). Kamieskroon, Springbok. Flowers white.
C. odoratum N.E. Br. (pleasant scent). Worcester. Night flowering, pink, with a pleasant scent.
C. pallidum N.E. Br. (pale). Worcester. Flower (?)
C. paucillum N.E. Br. (small). Graafwater, Clanwilliam. Night flowering, with agreeable scent, yellow.
C. Pearsonii (L. Bol.) N.E. Br. (in honour of Prof. H. W. Pearson). Bakhuis, v. Rhynsdorp. Flowers pink.
C. Pearsonii var *minor* N.E. Br. (small). Knersvlakte, v. Rhynsdorp. Flowers deep pink.
C. pisinum N.E. Br. (pea like). Karroo. Flowers greenish white.
C. placitum N.E. Br. (sweet, charming). Robertson. Flowers rose.
C. praecinctum N.E. Br. (forming small circles, spots run together). Touwsriver. Flowers yellowish.
C. Purpusii (Schw.) N.E. Br. (in honour of J. A. Purpus). Prince Albert. Flowers yellow.
C. Renniei Davis (in honour of Mr. Rennie). Dwyka River, Prince Albert. Flowers yellowish and the old flowers crimp up spirally.
C. rubroniveum L. Bol. (red snow-white). Pofadder, Bushmanland. Flowers white.
C. spirale N.E. Br. (spirally). Prince Albert. Flowers yellowish, old flowers crimp up spirally.
C. subglobosum Tisch. (nearly globular). Ceres Karroo. Flowers whitish.
C. tetracarpum Lavis. (capsule composed of four parts). Richtersveld. Flowers yellow.
C. tinctum Lavis (coloured). Richtersveld. Flowers yellow.
C. truncatellum (Haw.) N.E. Br. (truncate). Matjiesfontein and Oudtshoorn district. Flowers yellowish.
C. truncatum (Thunb.) N.E. Br. (truncate). Kamanassie, Oudtshoorn. Flowers yellowish.
C. turigerum N.E. Br. (tower like). Klipheuwel and Paarl. Flowers rose.
C. udabibense Losch et Tisch. Udabib Mts., S.W.A. Flowers yellowish-white.
C. Ursprungianum Tisch (in honour of Mr. Ursprung). Calvinia district. Flowers yellowish to white.
C. uvaeforme N.E. Br. (grape like). v. Rhynsdorp. Flowers whitish.
C. violaciflorum Schick et Tisch. (violet flowers). Springbok. Flowers violet.

(to be continued)

COTYLEDONS

By G. G. GREEN

I had intended to leave the description of the *Cotyledon* group until later on, but the appearance of flowers on *Adromischus clavifolia* this week prompted me to begin a job I've been waiting to do for some time. This is the separation of the true *Cotyledons* and the *Adromischus*, and as I have been busy with this work, I think the inclusion here of an article on the *Cotyledons* would be timely whilst my mind is occupied with the subject.

These plants, from South Africa, Abyssinia and Arabia, belong to the "showy" species of the wonderful family *Crassulaceae* in that the foliage is, generally, very beautiful and mostly covered with an attractive dusting of white "meal" or "bloom." The leaves vary in size, shape and colouring, some being broad, ovate or roundish, others lanceolate, cylindrical or wavy-edged. The leaf colour varies from the pure white of *C. orbiculata* to the reddish-green of *C. teretifolia* and they may be dusty, smooth and polished, or hairy as in the latter species.

Generally, the plants are strong growing, not necessarily tall, bold looking though not cumbersome, and instantly graceful and attractive in appearance. They are, on the whole, quite easy to grow and extremely hardy, enduring whatever extremes of temperature this island is capable of producing, providing they are under cover.

With some exceptions, the leaves resemble the "cotyledons" or seed "leaves" from which the name is derived and are easily distinguishable from other species of *Crassula*, excepting *Adromischus*, especially when covered with the dusty, white bloom. There are, however, a few species with long, cylindrical, green leaves tapering to points, and others with small, fat, egg-shaped leaves.

The flowers of the true *Cotyledons* are borne in false umbels or clusters pendant upon tall stems arising from the centre of growth, a feature which distinguishes them from *Echeverias* where the flower stalks are produced from the sides of the plants. They are bell-shaped, sometimes tubular bell-shaped, typically five-parted flowers, highly coloured in yellows, reds and greenish tints.

It is in the colour and construction of the flowers that the main difference between *Cotyledon* and *Adromischus* lies. *Adromischus* flowers are borne on somewhat shorter stems, in spiked racemes, being erect, much smaller, and narrower in size themselves and not so highly coloured as the *Cotyledons*.

The foliage is never very big and, in many species of *Adromischus*, is spotted with colour and takes on a variety of form in the different species. These smaller growing brothers of the true *Cotyledons* are infinitely interesting subjects for study and provide a very attractive setting for the larger growing species. Both like the sun, which brings out the varied colourings and markings to perfection and encourages a full show of bloom, and both seem much harder than most *Crassulas*.

The soil mixture for both can be the same as I've suggested for most of the *Crassulaceae*, though I loosen it up more with gravel for the *Adromischus*. Good drainage is essential for these and for some of the rarer *Cotyledons* that lose their leaves during the summer when the assimilation of moisture is reduced to a minimum.

With those species whose leaves are covered with white bloom, overhead watering is, obviously, to be avoided as the lovely appearance can soon be spoiled if the bloom is spotted or washed off, and though rotting is seldom existent, water nestling in the leaves of the smaller growing species, in sudden cold weather, can cause damage. Gentle spraying of plants without the white bloom is beneficial during the summer as it helps to freshen up the foliage and keep off dust and cobwebs.

The ideal way to grow *Cotyledons* is to plunge the pots in the mixture I use for *Mesembryanthemums*; sand, gravel and leaf mould, placing an empty pot amongst them for watering purposes. This can be hidden by means of a stone or rock and will not appear unsightly.

Watering through this pot can then be carried out without damage to the plants and the moisture will soon reach the roots which will be encouraged in a short time to search for it, thus producing as near natural conditions as possible.

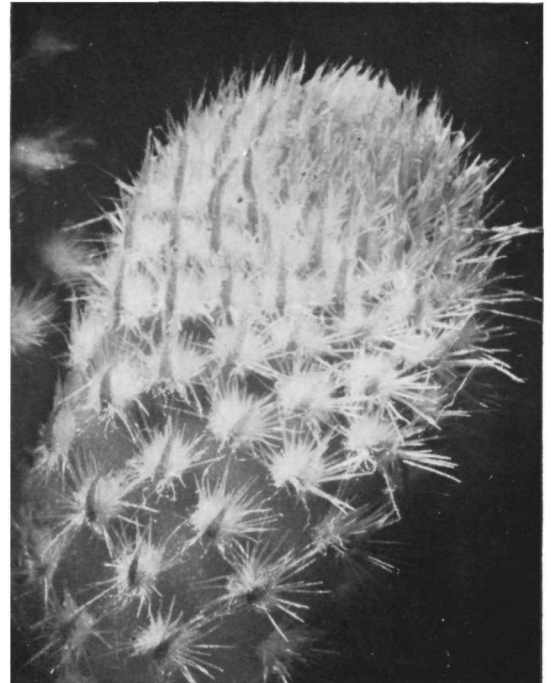
It is the hankering for natural conditions which provides much of the interest in collecting succulents or cacti. Many plants grown in the usual greenhouse conditions bear little or no resemblance to those of the same species living in their natural state and, as such, could not possibly satisfy the collector. Natural growth, colouring and form are ideals to be attained, albeit at the cost of much labour and disappointment, but once achieved the individual satisfaction is boundless and one's collection becomes a prize exhibit—at least to oneself—however small and cheap it may be.

I hope I may be forgiven for harping on this subject, but I can see no use in collecting either cacti or succulents



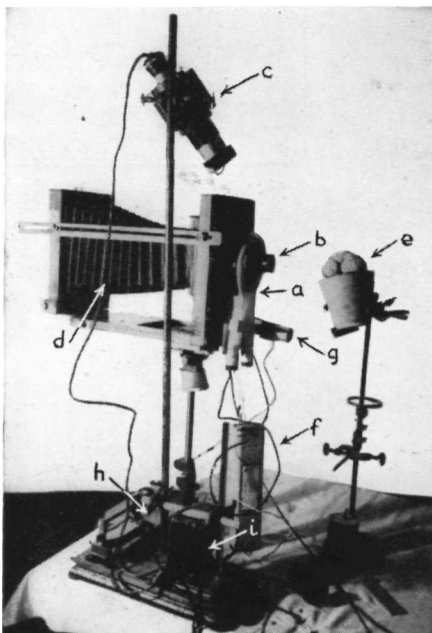
Mammillaria plumosa

Dr. E. Elkan



Opuntia microdasys rufispina

Dr. E. Elkan



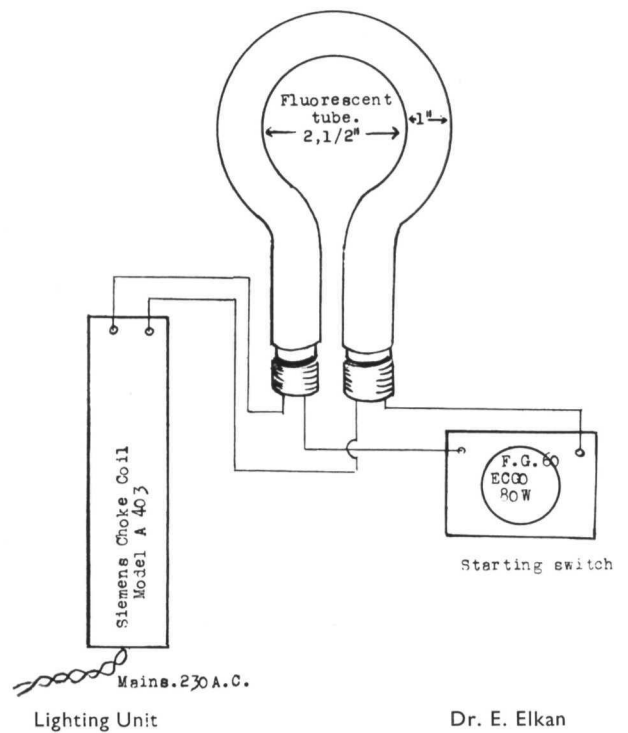
Camera unit

Dr. E. Elkan

- a Fluorescent tube
- b 9 cm. tele lens
- c Spot light
- d Camera with long bellows
- e Plant
- f Choke for fluor. tube
- g Switch " " "
- h Resistance for spotlight
- i Transformer " " "

Lighting unit for Photomicrography

E. Elkan



Dr. E. Elkan



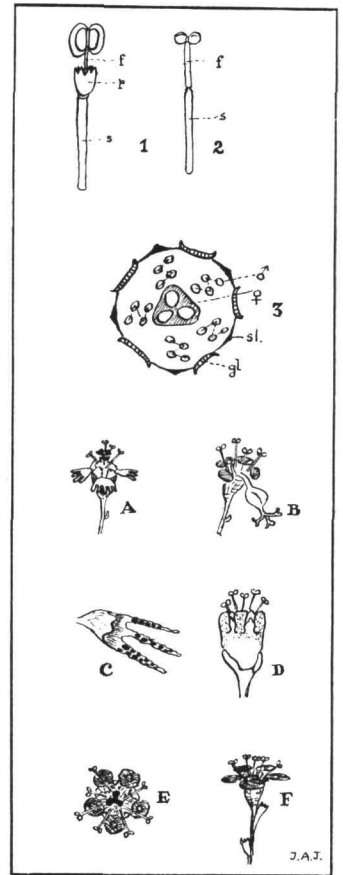
Mammillaria gracilis

Dr. E. Elkan

Part 2

Text to Diagram

1. Male flower of *Anthostema* with perianth. 2. Male flower of an *Euphorbia*. f—filament; p—perianth; s—pedicel. 3. diagram of cyathium; sl—lobe; gl—gland; A. cyathium of *E. caput-Medusae*. B. of *E. mauritanica*. C. gland of *E. Ornithopus*. D. cyathium of *E. heptagona*. E of *E. brevirama*. F. of *E. cereiformis*. A-F. Orig. 1-3 after Strassburger.



Euphorbia

J. A. Janse



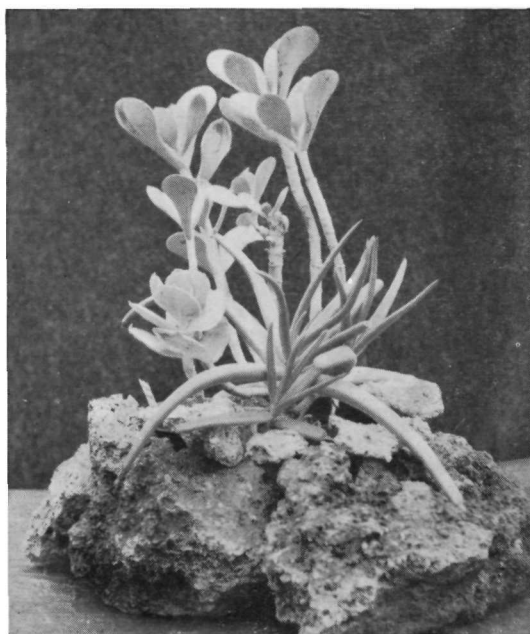
Conophytum Luisae

H. Herre



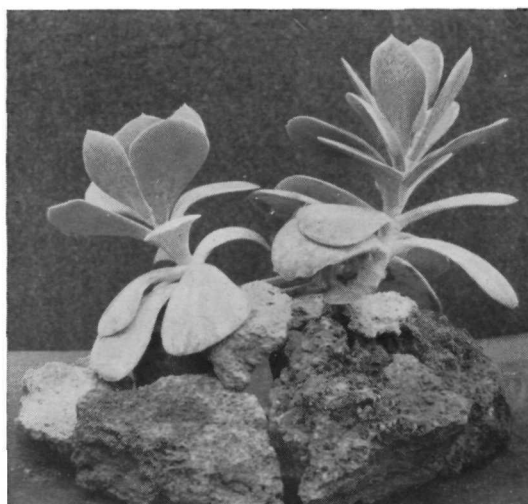
Conophytum Pearsonii

H. Herre



Cotyledon orbiculata, undulata, Wallichii

G. G. Green



Cotyledon orbiculata var.

G. G. Green

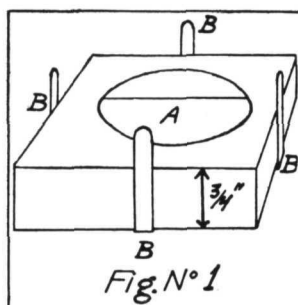


Fig. N° 1

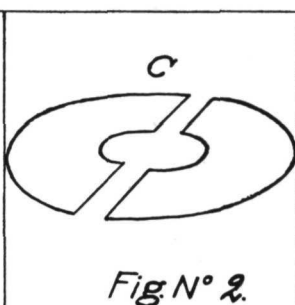


Fig. N° 2.

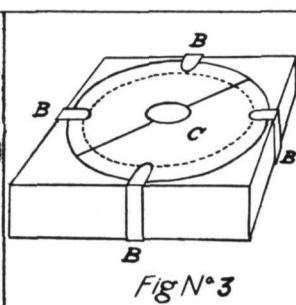


Fig. N° 3

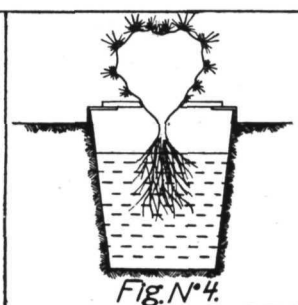


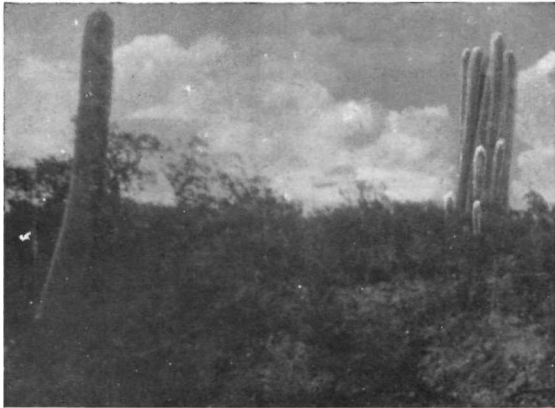
Fig. N° 4.

C. Elliott



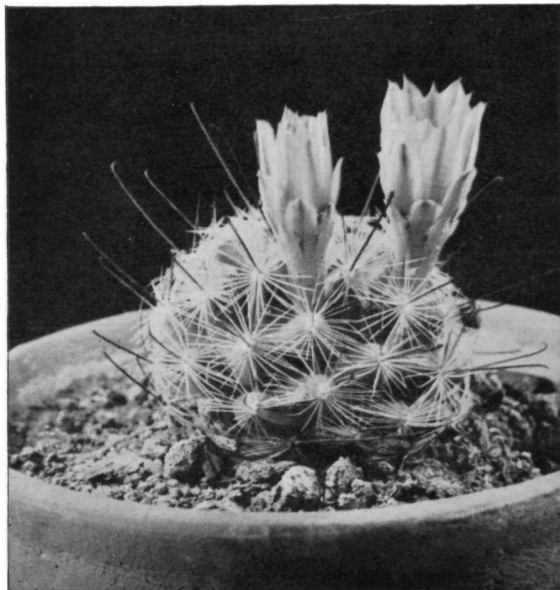
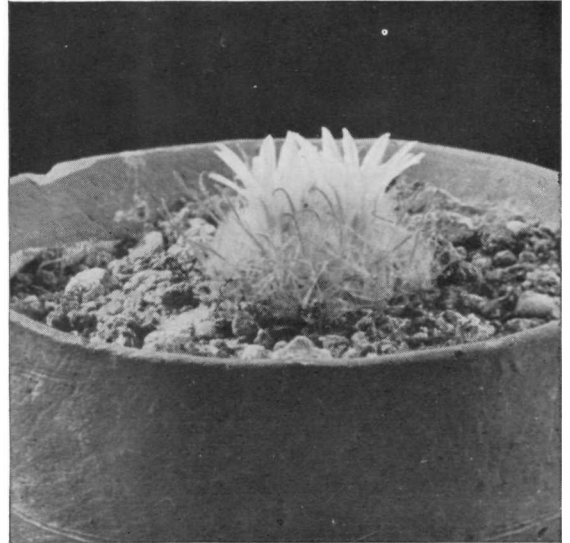
Exhibition, June, 1948.

E. Shurly



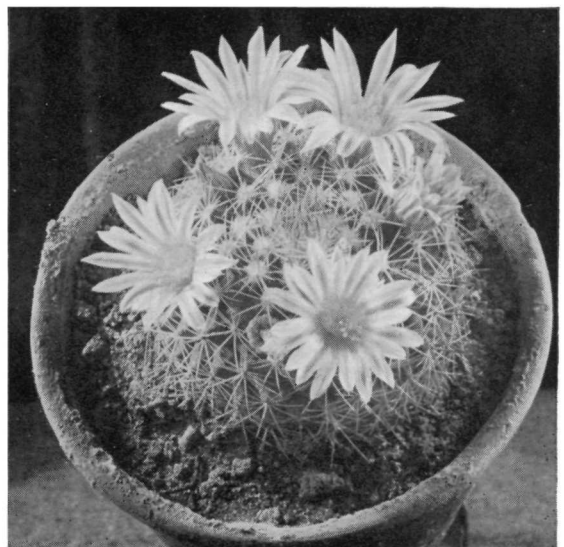
Cephalocereus senilis

Mammillaria pennispinosa E. Shurly



Mammillaria longiflora E. Shurly

Mammillaria gummifera E. Shurly



unless this point is uppermost in one's mind.

In the following list I have, as usual, left out many species that may be more interesting than those described, but space alone forbids the inclusion of every one and some are practically unobtainable at the present time. However, I think a fair representation of the genera is included that are definitely worth growing for those interested in this family, and which will provide a great deal of satisfaction if grown properly.

Taking the true *Cotyledons* first, the plant which everyone knows, but few seem to get to flower is

- C. orbiculata*, from the Cape Province. Free growing with thick, bluntish, short pointed leaves covered with white bloom. The flowers are reddish-yellow in summer. There seems to be quite a few varieties of this species, some with pronounced pink edges, wavy or almost green, but all bear an unmistakable resemblance to the true species. Good for background work.
- C. ausana*, leaves formed at the ends of the many branches, almost rosette in form, red edges to the leaves. Flowers orange-red, loosely suspended.
- C. cacalioides*, a peculiar looking plant. The stems bear the knobby remains of the leaves which dry up and fall off during summer. The leaves are almost cylindrical, similar to those of the *Stylophyllum* group of *Echeveria*, greyish-green in colour. Flowers are freely borne in large clusters, reddish-yellow. Watering should be cut down to a minimum in summer.
- C. wallichii*, is very similar to the above.
- C. orbiculata* var *oophylla*, smaller, fat leaves with pink-red edges.
- C. gracilis*, low growing with cylindrical, fleshy, pointed leaves. Flowers reddish, in early summer.
- C. macrantha*, another taller growing species suitable for background. Leaves oval, opposite, whitish, pink edged. Very free growing, flowers red outside, yellowish inside, in early spring.
- C. paniculata*, very tall growing unless docked. Leaves fleshy oval, tapering, greyish-green. Large red striped flowers, in summer. Water should be kept down to a minimum in summer when leaves fall.
- C. teretifolia*, cylindrical, hairy leaves with flattened points and red edges. Flowers yellowish, in summer.
- C. undulata*, a beautiful species with wavy edged leaves covered with white bloom. Needs careful watering during summer, very little in winter. Flowers reddish-yellow, in early summer.

Adromischus.

- A. clavifolius*, club shaped grey-green leaves with aerial roots appearing between. Flowers greenish red.
- A. Cooperi*, spotted grey-green leaves looking like birds' eggs. Flowers greenish on long stems. A very striking species.
- A. cristatus*, low growing, leaves with wavy edges. Reddish, hairy roots appear between the leaves. Similar flowers to above.
- A. libonaticus*, easily detached brownish-green leaves. Quick growing.
- A. hemisphaericus*, shiny, many-leaved plant with reddish tips. Quick growing and colourful in sunlight. Flowers greenish with red tips.
- A. maculatus*, a beautiful spotted-leaved plant, leaves broad with a black tip, low growing, reddish-brown.
- A. mammillaris*, rounded, longish leaves flecked with brown.
- A. marianae*, compact growing, grey-brown leaves with light margins curling inwards. Green flowers.
- A. rhombifolius*, broad, oval leaves, greyish-brown, scaly. Flowers pink.
- A. triflorus*, broad, fat leaves with brown markings, flowers light red, profusely borne.

Propagation in the case of the true *Cotyledons* is usually by stem cuttings which root very easily if given the usual treatment as described in previous articles. Seed can be sown where quantity is desired, or where mutilation is disliked. These should be sown in the manner used for other *Crassulaceae*. *Adromischus* leaves root very easily and quickly form new plants. The leaf cuttings should be kept dry until roots are seen, following which light spraying will encourage strong growth.

Will members please note that an asterisk was inadvertently added to Captain H. J. Dunne Cooke's name in the list of members. The secretary wishes to inform members that Captain Dunne Cooke's collection is *not* open for inspection, and asks them to be good enough to delete the asterisk in their list of members. Members intending to visit collectors are asked to write beforehand giving notice of their visit.

INFLUENCE OF TEMPERATURE ON HEALTH, GROWTH AND FUNCTIONING OF ROOTS

By C. ELLIOT

Articles in Kaktusar (1932, 1934 and 1935), on the cultivation of cacti in a nutritive solution, interested me and I experimented to observe, for myself, the growth and functioning of the roots.

My plants grew well, but suffered from chlorosis. A colleague suggested a modified solution and I obtained excellent results. Having succeeded with two small *Echinopsis*, I continued with a more varied assortment, *Echinocacti*, *Cerei*, *Epiphyllums* and *Zygocacti*, to my complete satisfaction, but from time to time unimportant brown spots appeared on the roots. Some of the plants were kept in the solution during the winter and their roots kept just as healthy as during the summer.

War restrictions prevented the use of artificial heating and then my troubles started. By waiting for fine days and exposing my plants outside, I encouraged the formation of young roots, and I then plunged them into the solution, keeping them in a room with a temperature of 64—68° F. Some days later, the roots had made scarcely any progress; some remained healthy, but others developed an increasing brown colouration. Where the infection attained its full development, the young roots had a very strong brown carmine colour and fell to pieces when touched, being completely rotted. The roots that remained healthy, without developing however, were those of cuttings. First conclusion, earth contains germs of infection and primitive roots are contaminated.

It was necessary to withdraw plants with diseased roots, cut off the damaged parts, disinfect them and, after drying, await the formation of new roots. Disinfection by a weak solution of sulphate of copper (2‰) did not give appreciable results.

As I had difficulty in obtaining distilled water, one of my colleagues recommended the use of rain water as it only contained substances that could not greatly alter the composition of the solution. This counsel was followed by catastrophe—all roots were tainted by disease. Second conclusion: rain water contains germs of infection.

Early summer was cool and wet and cacti in the soil remained stationary. I was able to control the state of the roots of cuttings for example, and I observed that roots did not develop, but were infected on contact with the soil. Later, when it was fine and warm, the roots commenced to develop rapidly, infection was arrested and, where they had only been attacked superficially, young growths were fresh and healthy.

My attempts to carry on during two years under these conditions were not satisfactory, but, in the end, they enabled me to come to several conclusions. I found the explanation of the phenomena and verified them by repeated observations under similar conditions.

Soil, air and rain water contain germs of infection. Micro-organisms manifested their greatest virility at a temperature of 64—68° F. (I made no experiments at lower temperatures). Temperatures beyond 77° F. arrested the noxious actions of micro-organisms, 95° F. assured the formation of healthy, rapid growing roots; 104° F., and especially 124° F., were yet more favourable. The alternation of high and low temperatures presented no danger; if during the day the temperature was 95° F. or more, and, during the night, fell to 69° F., it did not harm the roots.

Disease exclusively attacked young suction roots and not roots already formed. It is of little importance when tissues are tainted superficially, the danger arose when the infection attacked the vascular bundles in the centre of the root. If lateral roots were gravely tainted the infection spread to the vascular bundles of the principal root, and sap, ascending from the lower, healthy part of the root, transported the infection to the body of the plant. Therefore, it is necessary to cut away all parts of the root that show traces of disease and to leave only those parts that are intact and healthy. Disease progresses in the root during winter and can be transmitted to the stem, that is why it is necessary to examine and prune roots in the autumn or at the commencement of winter.

Roots differ from one species to another; fleshy roots (*Lophophora*) are more vulnerable than fibrous roots. If disease is stopped by a temperature sufficiently high, maintained during a certain period, a lower temperature does not provoke the reappearance of the disease; the micro-organisms have been killed.

My first successes were due to bottom heating. Following the reasoning that in tropical countries the heat of the sun is considerable, I substituted artificial heating because the rays of our sun were insufficient. The temperature of the soil, during the day, oscillated between 75 and 95 to 100° F., precisely the temperatures that stop the malady.

Disinfection raised a vicious circle; if the disinfectant was really efficacious, it killed useful as well as noxious bacteria, the soil must have micro-organisms to decompose organic materials for the plant's nutrition; the solution of the problem is to provide a temperature sufficiently high to form healthy roots, at the same time favouring useful bacteria that decompose organic materials.

A high temperature of the soil not only protects roots against disease, but is also a powerful stimulant to their growth and intensive functioning. Culture in a nutritive solution renders inestimable services and permits us to follow, in the least detail, the appearance of young roots, their development, assimilation of nutriment and the interdependence between stem and root. Set deep in the soil, between other plants, the receptacle containing the solution gets the same thermic conditions and, by observing your plant in nutritive solution, you will have a very clear idea of the action of roots in soil.

A temperature of the soil about 95° F. stimulates growth and functions of the roots that are expressed in vigorous stem growth, more abundant flowering and appreciable improvement in the spines. A too rich compost enlarges, especially when, in nature, the plant grows in poor soil.

Having established the role of temperature, I had occasion to note the chapter devoted to the study of roots in Helia Bravo's book "Cactaceas de Mexico," which says :—

"Roots of cacti possess the characters of xerophytic plants, adapted to the intense rays of the sun. Whatever may be the genus of the plant and the nature of the principal root, the sucking roots stretch generally from 1½ to 5 cm. below the surface of the soil. Cacti grow nearly always on rocky ground in the debris of stones ; stones are the best conductors of heat ; roots found at a shallow depth must be subject to strong heat, especially as vegetation is sparse and affords scarcely any protection. In the literature on cacti I have been unable to find any indications on the subject of the temperature of the soil. In one description efforts made by Russians to obtain new varieties of wheat by crossing different grasses such as Lyme Grass, there is the following passage : 'We have seen large quantities of Lyme Grass to the North of Kazakhstan on the watershed of mountains where the temperature of the soil attains 158° F.' This gives an idea of the temperature of rocky ground exposed to intense rays of the sun and we can consider it a probable maximum. We know already the effect produced by low and medium temperatures, now it remains to determine the ceiling of the temperature favourable for roots which varies from one species to another."

Here is a method of organising the culture in a nutritive solution. There are several formulas ; the following is the one I use :—

1 litre of distilled water	
Nitrate of potash	1 gr.
Sulphate of magnesium	0.5 gr.
Nitrate of calcium	0.5 gr.
Phosphate bipotassium	0.25 gr.
Sulphate of iron	0.25 gr.

Dissolve each substance separately in a small quantity of water and then mix together. A certain quantity of insoluble material is deposited at the bottom of the receptacle, but this is completely innocuous, but, in order to get a clear liquid, allow to settle and then carefully pour into another receptacle. Use cylindrical or conical glasses, narrowing at the base, as they permit us to see the least changes happening to the roots.

The preparation of a structure supporting the roots in the nutritive solution presents no difficulty. Here is one I employ.

Figure 1. A cover of tarred cardboard. A. opening permitting the passage of the roots, less in diameter than the glass so that the cover rests on the edge of the glass. B. legs permitting the holding in position of the layer of cork.

Figure 2. A piece of thin cork. Cut an opening for the passage of roots. The cork is cut in two to facilitate the placing of the plant.

Proceed as follows : place the cover on the glass, pass roots through the opening A, hold plant in the position it is to occupy, place one half of cork C and fold two of the legs B ; place second half of the cork and fold the remaining two legs.

Figure 3 shows the cover with cork in position.

Figure 4 shows the cover supporting the plant with the roots plunged in the solution.

The nutritive solution must be obscured as completely as possible in order to prevent the development of algae and to furnish the roots with conditions similar to nature. For this reason, the cover has the sides penetrating the soil (Fig. 4).

Before plunging roots into the solution, cover the base of the plant with a fatty substance, such as vaseline, to prevent the solution ascending to the body of the plant by capillary action. The deposit of salts on the epidermis is likely to produce corrosion and, finally, rot.

In order to provide sufficient aeration, only plunge two-thirds of the roots, leaving one-third above the surface of the solution.

When the level of the solution falls, due to absorption by the plant as well as evaporation, add sufficient fresh solution to restore the old level. Renew the nutritive solution about every two weeks.

PHOTOMACROGRAPHY (Photograph of Details)

By Dr. E. ELKAN

The harder one tries to make good pictures of a favourite plant, the less satisfactory the result seems to be. "What a lovely plant" we exclaim, and go a little nearer to see it better. The eye, at the same moment, adjusts itself to the diminished distance. We continue to see every detail in focus, but we see more detail now. We do not notice that our field of vision becomes smaller and we go a little nearer yet. We can continue to do this down to about ten inches (neglecting cases of short- or long-sightedness), but there is much more interesting detail in most plants than we can distinguish at that distance. Automatically the hand dives into the familiar pocket and out comes the magnifying glass. The magnification we achieve becomes higher and higher, the field of vision smaller and smaller, we hardly notice it; the process of going nearer and nearer and eventually improving the power of the lens in our eye by adding the pocket magnifier has become so familiar to us, we no longer notice our power of accommodation. Only when our curiosity transgresses the bounds of ordinary magnification and we have to get out the microscope do we become aware of the fact that we are dealing with applied optics all the time. No, not even then. The fact is sharply brought home to us when we try to photograph what we see. For, while seeing is a continual process conducted with the help of the ever adaptable eye, the photograph only produces a "still." The details it will contain are determined by our camera the moment the picture is taken. The most powerful magnifier will show up no more detail than the original camera allowed to pass; on the contrary, the more we enlarge our photographs the more woolly and unsharp do they appear to be. We must make up our mind beforehand about how much detail is to appear in the final print.

Such is the handicap of photography. Take, for example, a specimen of *Mammillaria plumosa*. At three foot distance it looks like a large moth ball. At one foot, it looks more fluffy, but little detail can be distinguished; only the magnifier resolves the intricate surface of this plant into a pattern which explains its peculiar appearance. The tubercles bear a crown of feathery plumes which are densely interwoven and overlap so as to form an umbrella which shields the plant against excessive insolation and, at the same time, prevents too much evaporation of water. Without seeing these plumes we have not seen the plant. Ordinarily, we cannot see them without a magnifier. Can such a thing be photographed? It can—everything can be photographed—but it is not easy. The microscope would not help us; the magnification would be too great. And the ordinary camera would not help us because the magnification would be too small. We need a camera with a strong lens of short focal length and with long bellows. We then get a sufficiently enlarged picture of our plant surface to show the wanted detail and at the same time sufficient depth if we stop down as far as the lens will allow us to do.

But there are more snags to overcome. The plant has to be brought very close up to the lens; there is no room between the two for a spot-light. Lights applied from the sides are unsatisfactory since they light up the marginal part of the field more than the most important centre. The difficulty can be overcome in the way illustrated in the accompanying photograph. A fluorescent tube was bent into the shape of a horseshoe and fitted round the lens (in this case a 9 cm. tele lens $f:4$). This tube, run off the mains via a choke and starter switch, emits a brilliant bluish light, very suitable for rendering a white object. The only disadvantage of this arrangement was that the illumination was too even;—a small spotlight (c.) was, therefore, applied in addition to the fluorescent tube and the result is, I think, satisfactory. Some detail will, as usual, be lost in the printing. This is deplorable, but apparently unavoidable, in spite of the never-ending lament of photographers. The exposure, in the case of *M. plumosa*, was one minute with a plus x pan film (Kodak). No filters were used. The picture of the budding *Opuntia microdasys* was made under identical conditions. The minute glochids of this plant constitute the cactus photographer's worst challenge. But I think the fluorescent tube gives us an idea of what they look like.

From Mr. H. Hall: "I threw a piece of *Argeta petrensis* and small-leaved *Crassula corallina* on to the window ledge of my potting shed on December 9th last, when potting the plants collected on our trip. They have had neither soil nor water since (16th April, 1948). The *Argeta* is very succulent, but looks as fat and sturdy as when cast away. *C. corallina* is very much of the habit and form of *Sedum dasyphyllum* and, therefore, not very succulent. I expected it to shrivel away weeks ago; it has endured terrific temperatures, yet it lies there like a small handful of moss, happy, coloured and with heaps of roots searching for moisture. It is a lesson in endurance. I do not suppose the *Argeta* will take any harm for another year at least."

EUPHORBIA SUSANNAE

By H. HALL

Glancing through the Journal for January, 1947, the other day, I came across the article "Euphorbias," by J. A. Janse, and was rather astonished at the high temperatures advocated for the tropical *Euphorbias* and "those from the dry and hot coast of S.W. Africa." Surely a minimum of 60 degrees C. is far too high, and I assume that the Centigrade scale was given in error. Not many growers in England can maintain a minimum of 60 degrees Fahr. these days, and I can assure readers that providing the plants are healthy, have been gradually ripened off in autumn and the soil suitably dry, they will tolerate much lower temperatures without harm.

Mr. Janse refers to *E. Susannae*. It is certainly a very choice species, but it does not, so far as I can ascertain, come from Namaqualand. It is native of several localities in the Little Karroo in Cape Province, and was named after Mrs. Susanna Muir of Riversdale. Last December I had the pleasure of finding a few plants in the wild state. We were homeward bound from our collecting trip and were traversing the seemingly endless road which meandered over the veld between Ladismith and Montagu, making stops whenever the surroundings showed promise. Stopping near some stony patches I observed my first specimen of *Apicra aspera* a few feet from the road and was seeking for another specimen when I saw, for the first time in the wild state, a perfect plant of *E. Susannae*. It is so distinct in appearance that anyone having seen an illustration would readily know it at once. Like the *Apicra*, it grew beneath the shade of a small shrub, had a perfect diadem of small, uniform side-shoots, was bright green in colour and the whole plant was flush with the level of the ground. Soon I realised that we were in a small area containing scores of the plants. One young plant I noted was minus side shoots and its curiously tubercled stem was very reminiscent of the rare cactus, *Obregonia Denegrii*. Adult plants were perhaps five inches across, that including the side shoots of course, and not a single plant was seen away from the shelter of a twiggy bush.

E. Susannae has most of its bulk below ground in the form of a swollen tap root which goes far down into the stony ground, and it is no easy task to extricate a specimen without damage to this vital part of the plant. As with many other tap-rooted species, the plants had one or two smaller roots which, emerging from the main root an inch or two from the top, grow upwards instead of outwards and downwards, in most cases pressed close to the parent body, but this could be caused by the hard nature of the ground, the roots merely taking the easiest course. It has been suggested that these curious, up-pointing roots indicate the pulling-down action of the main root as it draws the plants down into the ground during the summer drought, thus leaving the side roots behind in the process. Personally, I tend to the view that these side roots could be used to make use of the surface moisture after a small shower of rain, when the main tap root would be far too low down to be affected by such small shower.

In cultivation in England this species, and several other turnip-rooted species, tend to elongate, that is the growing points cease to remain a flattened area, thus losing that distinctive appearance. This is scarcely avoidable owing to lack of light, excess water, and spending their lives under glass. Although I did not observe roots forming on any of the side shoots which are buried to their tips in soil, they readily form roots when treated as cuttings. Whether they would eventually give rise to their own crop of secondary stem and become typical *E. Susannae* I do not know. Time will tell.

On page 18 of the January Journal, I gave a description of *Mammillaria pennispinosa*. It has now flowered and the description is :—Flowers in May. Campanulate, short tubed, one flower in each right-hand axil, at bulge of plant, diurnal. 15 mm. long, 12 mm. wide including 2 mm. green ovary. Outer sepals 2, linear tapering to point, entire, pale green, green centre upper half only. Inner sepals 4, lanceolate, entire, green centre to below point, rose midrib upper half, partly under green centre. Petals 12, oblong to pointed apex, entire, white, pale rose midrib. Filaments white. Anthers white, pollen small, round, fluffy, creamy yellow. Style 8 mm. long, pale greenish white. Stigma 3, pale greenish white, long linear, spreading, pubescence pale green. Unusual stigma is made up of a single lobe between two bifurcated "pairs," but no lobes on fourth side of style. Bifurcated stigma have line down to base from separation half-way down ; this line is not separation as lobes are solid from half-way downwards. E. Shurly.

THE DISCOVERY OF CEPHALOCEREUS SENILIS

After the war, the favourite "Old Man" cactus was thought to have died out. I did not believe this and, in 1923, I followed in the tracks of my countryman, Benedikt Roezl, hoping to find it again. And I have got all I set out to get. Above the little mining town of Cardonal, which had been destroyed by the revolution and vacated by the inhabitants, we came to a mesa at the entrance to the ravine where Roezl, more than eighty years ago, had collected *Cephalocereus senilis*. We climbed up through rain and thick mist, unfavourable for photography. A decade ago the ravine had been plundered. One Yankee alone removed from here two hundred thousand plants. Still, on the opposite slopes one could see from afar several forgotten giants; many appeared to be nearer and others almost within reach, but deep ravines (60—80 metres) separated us from them. The way went up into the mist and then down again to a stream, which had eaten through the deep valley in the "mesa" through the work of ages and uncovered the "barranca de los libros" (Library Bank) in the vertical schist. Capilarity draws the moisture through the layer of schist up to where, amongst damp moss and ferns, the *senilis* grows. But darkness closed in in the valleys around us, and we were obliged to spend the night at the gate of the kingdom of my dreams. The first rays of the sun found me already climbing, clinging to the steep walls and searching for small seedlings. The first plant that could be collected was reached. It was small and crooked, but I could touch it with my hand! Once again, after how many years! Soon my friend, Don Octavius Solis, could also admire the beautiful giant not yet of flowering size. The specimen, over six metres high, wore on its head the first bridal veil, the so-called cephalium, and promised a rich harvest of seeds in the next decade. But the real seed-bearers were so tall that one had to cut them down with a hatchet. The gigantic columns plunged into the valley below, broken into pieces, still I found viable seed in cephalia covered with the dust of centuries. "What a shame! What vandalism!" the cactus lover will say. My Indians said the same. But the cut stem produces new snow-white heads, more beautiful than before. Soon, after another fifty years perhaps, they will be dirty again. Not only man, but lightning also splits up many stems which tower too boldly to the skies. The enthusiast forgets how far behind him the camp lies and does not mind if the cold, damp night overtakes him. His teeth chatter with the cold. But soon the sun rises again over the opposite side of the valley and the further he presses forward, the closer together are the Organ Pipes. Omniscient Nature has brought her majesty to culmination; she has set the sober senile old man in the valley of eternal snow, from which the explorer and his companion have returned with baskets full of booty, and with impressions that will never be forgotten. There stands the splendid temple of nature, the valleys which no robber visits—and yet I robbed this holy place—in fact I did more; in the interests of science I have described the newly discovered valleys—and today these valleys are completely stripped—the jewels of nature have become worthless junk. We paid dearly for the wantonness. We felt the exhaustion of the homeward march; a sick comrade had to be carried. In these valleys, which have become too damp in the last decades, only the mist-loving, white-haired cacti can bear the excessive moisture.

The greater part of the plunder was frozen through the neglect of a customs house officer. Still the collector could, after his return home, watch the buds developing on a rescued and grafted cephalium. And when I see the seedlings, the young "Old Men" in my collection, my thoughts go back to the *Senilis* valley.

"I should like to challenge a remark by Mr. Boarder at the meeting on March 16th, that it was doubtful if plants imported before the war were still alive.

"We are more interested in the other succulents so that, during the war, our cacti got rough treatment with no heating from 1940—1946; watered about once a week in summer and never repotted till 1946 and 1947 and which is not yet completed. Of 200 or more plants, mention may be made of a few, the number after the name being the date of importation. *Astrophytum myriostigma* (1930), now a large plant, flowers annually; *Ariocarpus kotschubeyanus* (1930) and *A. fissuratus* (1930) have grown well and the former flowers; *Aztekium Ritteri* (1930) flowers every year, has made several new heads; several *Lophophora Williamsii* (1930) have grown and flower and fruit each year; seven or eight species of *Gymnocalycium* (1929) are flourishing and most flower annually; *Trichocereus pasacana* (1932) has made good growth; a number of the large *Echinocacti* (about 1931 and 1932) are in splendid condition. Of the *Mammillarias*, *M. plumosa* (1930) has made two fine clumps, *M. Petterssonii* (1932), *M. fuscata* (1934), *M. carnea* (1931) and *M. Haageana* (1931) have all made large plants and *M. fuscata* is flowering freely this year. This by no means exhausts the list, but is enough to show that there are some imported plants still alive in this country after some eighteen years, within twelve miles of London. Vera Higgins."

AN UNNECESSARY ATTACK

In News Letter, April, 1948, of the "National" Society, Mr. Roan is reported to have said at their Annual General Meeting :—

"Several attempts have been made to find a way of getting the Cactus & Succulent Society of Great Britain to agree to seriously discuss ways and means of amalgamating and forming a new Society. Although we have about four times as large a membership, we had offered an amalgamation on equal terms so that a fusion would not mean more gains than losses to either party. It was found that the Committee of the Cactus & Succulent Society of Great Britain was quite adamant that they did not desire to proceed with discussions although the rank and file of their members had never been consulted in the matter and even had some difficulty in obtaining full information. The Committee did not evidence any desire to properly understand our proposals. We, who believe in democracy and in considering the welfare of our members who elected us before our own positions on the Committee, find such an attitude peculiar, to say the least."

This statement is full of inaccuracies and it is incredible that he should have considered it necessary, especially as they did not consult their own members in the matter ! We have deliberately avoided comment in regard to his Society so that any future negotiations should not be prejudiced, but the above set of mis-statements cannot be left unanswered.

Let members form their own opinions. A meeting took place with their representatives at which they proposed that both societies be merged in a National Cactus & Succulent Society of Great Britain, a name which we rejected because it was cumbersome and repetitive. Cactus & Succulent Society of Great Britain, apart from being our title, is most apt and would be selected, for its suitability, if no society existed, but they would not drop "National." We showed, however, a willingness to consider a new title if that was the only point of difference, but their idea was that the new society should be on the basis of their existing branches. This meant that their organisation would survive, with ourselves extinct. Their Council of about forty is made up of four founder members plus two from each Branch. Our provincial members would be swamped in their branches ; our members in London absorbed in their London Branch. About 38 against part of 2 ! The London Branch would only be allowed to handle £5 at a time for expenses and have to apply to them for further funds, if they considered it wise ! If that is their peculiar idea of "equal terms" and "democracy," then it is not ours.

It might easily be assumed that such proposals were simply a move to gain complete control of both societies and, banking on their own branch representatives, to get their own nominees elected as officers and committee and their own procedure and decisions passed. We do not claim to have all the virtues, but we do feel that we have more knowledge and understanding of the subject than anything they can offer. We were established in 1931-32 and cannot tamely submit to a situation that accepts the formation of a pirate society to swamp the interests, enthusiasms and work of those who have gone before and, even more important, we consider that their proposals would not result to the interests and benefit of our members, nor their own.

If they are genuine in their desire for really democratic fusion, we suggest that something could be formulated on the lines of North and South Sections, divided by a line, say, from Humber to the Mersey ; each section to carry on its own affairs, controlling its own finances, even their own Journal and accounts combined at the end of the year. With such a scheme we could amicably and happily run together, working in unison and getting the benefit of each other's good points and the difficult position, whether one or two Journals, could, without doubt, be resolved. In so many ways there could be economy and greater efficiency with added benefits to all. This suggestion was our contribution to the meeting, but Mr. Roan would not even listen to it.

We have no personal ambitions to achieve and our sole object is to render our subject better known and understood by members and others and we want no place in ambitious personal schemes for power and place.

(Since the above was written, and just as our Journal was ready for the printer, the last "National" Journal contained a further attack on us and the charge is made that the translation by Mr. Harle was not published correctly, or in full. That is definitely false as Mr. Harle's translation was reproduced word for word. Mr. Milton and I strongly resent the charge against our probity. The incident shows to what lengths Mr. Roan will go in his endeavour to gain his ends. The rest of his remarks can safely be left to members, even his own, to judge for themselves. Ed.)

REPORTS OF MEETINGS**April 13th, 1948.** Discussion on Exhibition Classes.

A useful discussion took place and readers are referred to the report on the Exhibition.

May 4th, 1948. P. V. Collings : Pests.

Several pests infest greenhouse plants, such as, mealy bug, root bug, scale, woodlice, red spider, ants, cutting bees and humans !

Mealy bugs lay 500 eggs in white wool, five times a year. They attack all cacti and succulents, especially *Mammillarias*, killing the plant by sucking the sap. A good syringe with warm water washes out adults and eggs.

Root bug is caused by excessive dryness and the attacked plant looks sickly. Tip out the plant, clean off soil and, if roots affected, dip in a solution of methylated and nicotine, 40 parts to 1, syringe again with warm water in half an hour and, before quite dry, repot in fresh soil, keeping in shade till dry.

Scale : brown ones attack *Aloes*, *Agaves* and *Gasterias* ; small yellow ones attack cacti and many succulents, especially *Opuntias*. They come off easily with warm water and do not mark plants afterwards.

Woodlice : simply wolf seedlings. A piece of potato with the centre scooped out, left lying about overnight, scooped part downwards, will trap many ; shake them out and destroy in the morning.

Red spiders have eight legs and are not true spiders ; they do the damage, before being noticed, by biting fleshy parts. Syringe with warm water, which is not a shock to plants.

Ants do not damage plants, but farm mealy bugs for the sticky substance they exude ; are difficult to eradicate ; watch runs on a warm day and, when nest is found, pour boiling water over it.

Cutting bee bores into soil, taking a leaf in which they lay their eggs. They know the pot, but if it is taken away they get disconcerted and leave. Destroy grub.

The human pest squeezes and plays with plants and kills them ; touch leaves with " bloom " and spoil them. At exhibitions be careful not to touch plants.

Insecticides leave an oily substance on plants which impedes breathing. I find warm water (100°) and a stiff syringe more effective. The meeting was sceptical of Mr. Collings' warm water and other remedies were suggested, including derris.

May 29th, 1948. Visit to Kew.

Very heavy rain completely ruined the day which was occupied by lunch, Sherman Hoyt House, the Succulent House, and tea ; it is regretted that circumstances did not permit a visit to the pits. Thirty-eight booked for lunch and 40 turned up ; 71 booked for tea and 64 turned up, all in the pouring rain with a miserable time in front of them. While we have such enthusiasts we shall not fear the future. The officials tender their gratitude to all present, including members from Sheffield, Derby and Windsor. Photographs were taken, but it is doubtful if they can be successful, but if they are they will be published in the next Journal.

June 8th, 1948. Discussion on the Exhibition.

This has been incorporated in the report on the Exhibition.

From Mr. Boarder : " Mr. Shurly has kindly sent some more seed for free distribution which he received as a member of the Botanical Society of South Africa. Anyone desirous of trying their skill should forward a stamped addressed envelope to Mr. A. Boarder, Marsworth, Meadway, Ruislip, Mddx. Special kinds asked for will be sent as far as they will go round. All applications to be sent in by August 10th. If you are not particular, a selection will be sent. The seeds are : —*Bergeranthus* sp ; *Faucarias Britteniae*, *Boscheana tigrinum* and sp ; *Cissus Juttae* ; *Crassula falcata* ; *Gibbaeum perviride* ; *Argyroderma* sp ; *Glottiphyllum longum* ; *Cheiridopsis Comptonii* ; *Gasteria maculata* ; *Euphorbia pseudo-cactus* ; *Lithops* sp ; *Rochea coccinea* ; *Lampranthus aureum* ; *Stapelia* sp ; *Muiria hortenseae* and various *Pleiospilos-optatus*, *simulans*, *Nelii* and mixed. *Mesembryanthemaceae* seeds should be one year old before sowing ; these were received in 1947 and can be sown at once."



President : Earl of Mansfield

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SOCIETY NEWS

- August 10th : Experts' Evening.
 September 7th : Covent Garden cacti and succulent corner.
 October 5th : Autumn Show.
 Discussion on the Show.

Experts' evening follows the Novices' evening in July and it is intended to give ten minutes to each expert present to speak on some phase from his experience which he feels will be helpful to members.

Covent Garden cacti and succulent corner is a resuscitation of the successful evening we had in 1947. It will be remembered that members brought up plants for free exchange, disposing of their surplus and many gaining plants they had been searching for for a long time. Possibly the most successful feature of the evening was the social side which caused so many to contact other collectors. The evening was voted a complete success by all attending.

The past quarter has been a comparatively busy time with The Ballot, preparation for the Exhibition and the visit to Kew, reported on other pages.

The Treasurer reports a satisfactory state of affairs with finances, renewals and other matters. Some renewals still continue to be sent and new members are coming along.

It is curious so little response has been achieved from members in the provinces in regard to forming branches. It would have been thought that proposals for local meetings, helped by headquarters, would be welcome and at which they could contact fellow county members and be able to discuss with them the problems and pleasures of their hobby. If it is simply a matter of shyness, forget it, write to the secretary or the editor and it will be treated as confidential until you feel stronger ! It is our desire that all members should be able to enjoy the fullest benefits possible. It is hoped that the letters recently sent out in some counties will have a positive result.

Did you recognise the article "The Discovery of *Cephalocereus senilis*" ? It appeared, with the illustration, in our Journal of June, 1933. At a recent Council meeting the question was raised whether reprints of old articles would be welcome, and it was stated that many would be quite new, even to members since the foundation. The article was by the late Mr. A. V. Fric, the famous Czech enthusiast.

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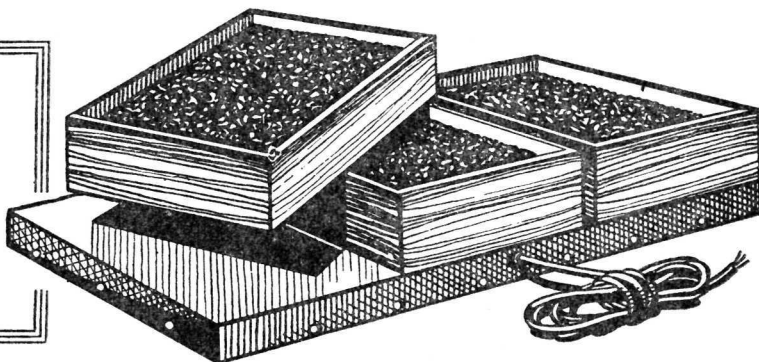
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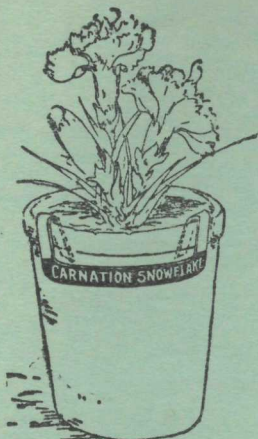
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Established 1931

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EDITORIAL

Some, at least, of the members have had the opportunity of inspecting Professor G. C. Nel's "*Lithops*" and they will, I am sure, confirm that it is an extremely handsome production full of information and particularly useful because of the plethora of illustrations.

I have given the book considerable study and it resurrects, in my mind, a subject that I have considered, from time to time, for many years past. I refer to the popularly known term "mimicry plants."

For many years, I have found it difficult to bring my senses to the idea that these South Africa succulents mimic their surroundings. The term has become so popular that the new comer gets the impression that they are the chameleons of the plant world. The illustrations in Professor Nel's book, of the various species frequently vary in colour with the same species, but, invariably, they are shades of the same colour. This seems to support the popular view that these plants are the chameleons of the plant world.

Do these plants change colour according to their surroundings? Is it true that they assume the colour of the ground surrounding them?—a very different thing to chameleon-like change of colour. Is "mimicry plants" a misnomer?

I have noticed in my long study of *Mammillarias* that colour is an extremely fugitive characteristic. Many plants imported from their natural habitat arrive with the colouring of the spines strongly enforced and distinctly different to the plants we usually associate with the species. This colouring disappears under our methods of cultivation and in our climate, and the vividness and liveliness are soon lost. It seems to me that the loss of colouring, a common experience of those who handle imported plants, is due to different conditions of cultivation. It is well known, in ordinary horticulture, that the colour of flowers, etc., can be enforced, and vice-versa, by the insertion of certain materials in the surrounding soil. I believe the loss of colouring in our plants is due to the lack of certain chemical constituents which are found in the soil of their native habitat. We must also consider the extremely important factor of the sun's rays which is, invariably, much weaker and not so constant, as in the natural habitats.

I suggest to Professor Nel that the coincidence of the colouring of *Lithops* with the colouring of the surrounding soil is due to the chemical constituents of the soil rather than the inherent ability of the plant to mimic its environment. If the talented author could give us his views and his experience on this matter I feel sure he would be usefully contributing to the knowledge of our plants. Debunking, to use a vulgar colloquialism, the fetish of "mimicry" plants would help us to get down to bedrock and not foster an idea which, I think, may simply be an illusion.

CULTURAL NOTES

By A. BOARDER

As these will be my first Cultural Notes since the Summer Show of our Society, I feel that I should make a few comments on the plants exhibited with regard to the condition and appearance of the exhibits. There is no doubt that the majority of plants were in better condition than those which were shown last year. So many looked to be actually growing which after all is what we expect to see. As far as I am concerned the plants should look healthy and growing. It is not enough that the plants are rare, as the exhibition is not intended to be a museum, but the chief aim of exhibitors should be to show plants which are really growing. After all there is little credit due to exhibitors unless they can show that they can grow plants as well as collect them. In one or two classes plants were down pointed because they did not look healthy and growing, and I know that some exhibitors were disappointed because their plants did not win, but unless they are in growing condition they will not be placed in front of plants which are shown in a flourishing condition.

There is no doubt that these shows do help the hobby considerably, as many people see the plants other than actual members of the Society. This is all to the good as it will encourage more to take up the growing of succulent plants. I always like to see the plants either in flower or showing signs of having flowered, although of course I know that all kinds do not flower at the same time. It is always an attraction if there are a few plants in flower, as so many people have such vague ideas as to the flowering properties of these plants.

The young seedling classes were not as good as they should have been in my opinion. Perhaps I expect too high a standard but I do think that much better results should have been obtained in the period since the war. I am raising a fresh collection of seedlings sown during or since 1946, and I can already see very many fine plants. Some *Mammillarias* which I raised from seed during this time are now nicely covered with fruits from flowers produced. A *Mammillaria Pringlei* raised from seed given to me by our Chairman in 1946, is now $3\frac{1}{2}$ inches wide by $3\frac{3}{8}$ inches high, and the splendid spines have to be seen to be believed, the measurements given are including spines. I notice that already I have at least one hundred and fifty different *Mammillarias*, and I must soon start clearing out some of the other succulents which I have raised from seed both as experiments and with the idea of helping to fill the otherwise empty greenhouse. I had hardly dared to hope that I should be able to get together a collection so soon.

It is good to see that there are more seeds available now, as imported plants are still almost impossible to obtain. This brings me to a point that I would like to clear up. In the last Journal, Mrs. Higgins challenged my alleged statement about imported plants. Well, if Mrs. Higgins really heard me say that it was doubtful if plants imported before the war were still alive, then I must have said so. I suppose that is the fault of speaking impromptu as I always do, I think talks which are read are usually so dull. What I intended to imply was that without doubt many plants which were imported before the war were not alive today. I have actual experience of this, but of course I also know of many imported plants which are still alive, some of them that I imported myself are still doing well although they are not at present in my collection. While on this subject I should like to enlarge on the point that I made in the same talk, that many plants were torn up by their roots from their native habitat before being despatched to this country. Therefore, there were two kinds of plants imported before the war, the collected plants and those which were actually raised from seed by the nurserymen. Naturally, the latter plants had a much better chance of survival than the former and there is no doubt that it was among the former that there were so many losses.

Since the issue of the July Journal I have had a letter from a member in France asking me how I could possibly grow Cacti as quickly from seed as I claimed. In fact he was so curious that the other day I had a surprise visit from him just to make sure that I had nothing up my sleeve. Well, he seemed duly impressed, in fact he said that he was amazed. While talking over my methods I mentioned loam. This puzzled him as he had no idea what this was, and thought that it might be rotted leaves. In the hope that it may be of interest to others, I would like to explain that loam as referred to in this country is the top layer of an old-standing meadow, say about four inches deep, which is stacked grass downward for some time until the grass has partially rotted. This is then broken up and used as the basis for potting soil.

I have often mentioned the special potting soil for cacti as prepared by Woodman's of Pinner. Now I have no

axe to grind over this and have never had a bushel without paying the usual price, I recommend it chiefly to save people a lot of trouble and expense which they would be put to if they mixed it themselves. I have tested this soil and am positive that it is excellent for growing cacti and, if members cannot grow their plants well in it, it is their own fault and not that of the soil. The basis of the compost is the usual John Innes potting compost which is made up to the formula by many nurserymen. It is possible that this may vary in that the loam used may have come from different districts, which may affect the actual condition of that loam. To this compost is added crushed brick, granulated charcoal and fine crushed bones. The two former to increase the porosity of the soil, and the latter to add a little more nourishment to last the plant for at least a year.

A member recently posted to me a sample of soil received from the above firm, asking me if I thought it suitable for seedling cacti. The enquirer had ordered some Cactus seed compost and had been sent the Cacti potting soil. You see the seed compost which I recommended is just the ordinary John Innes seed compost, and that is all that should have been ordered. No doubt, one of the employees of the firm saw the word Cacti and forwarded the only mixture with the Cacti name, and so the enquirer received the potting compost instead of the seed compost. This latter can be obtained from any seedsman, it should all be made to the same formula. The seed compost contains much less loam than the potting compost and the added fertilisers are weaker.

By the way, I have made a few experiments this year and find that this seed compost may be used as it is, without going to the trouble of sifting it first. My results with the unsifted soil have been quite good and so in future I shall not trouble to sift it at all. I also tried covering the sifted soil with a thin layer of finely crushed red brick to test the result. I found that it did tend to prevent the caking of the top surface, but I also found that by using the compost unsifted the same result was obtained.

Some people had trouble in germinating *Cissus juttae* last year and I was among them. This July I tried again with four or five seeds and this time I used the same compost but stepped up the temperature of the propagating frame to about 75 degrees. This had the desired effect and I have now three plants growing fairly quickly. It is quite possible that several of the South African seeds might germinate better if they had a little more heat, as no doubt out there they are subjected to intense heat at times. I have been sending out more seed this year and I am very sorry if some of the applicants may have been disappointed in not receiving all the kinds for which they asked. The fact is, the list was prepared before the seeds were removed from their pods. I say removed advisedly, as I had plenty of experience of removing people in my late occupation but I never had such a job as I had in trying to extract some of the seeds from their pods. I have repeatedly been told how simple it is—all that is required is to place the pods in water and, hey presto, out come the seeds, or do they? If so, why have I been up half the night, several times working with nut-crackers, pliers, knife, etc., to try to get the seeds out of their pods? No, it is not so easy; and then I found that there was perhaps only one pod with hardly any seed in it of at least one species. Most people wanted the same kinds and they were in too short supply to spread them around to all who asked for them. On top of the removing of the seeds I had to packet them up; over 400 separate packets and to add to the task the tiny envelopes had to be gummed individually and then all had to be named. Well, good luck in raising them anyway and I suppose the job kept me out of mischief. I am sorry that my spare time will not allow me to reply to everyone as I would like to do, but I hope that if any member has a growing problem he will write to me and I will do my best to answer it in the next cultural notes. In this way the information may be of interest to many other members too shy or busy to ask themselves.

By referring to my notes in previous Journals you may obtain most of the information on cultural notes for this time of the year. I do not wish to repeat myself too much but I must advise all those who will have limited heat this coming winter to prepare their plants in good time so that they may be in the necessary dry state if they are expected to go through the winter with little or no heat. Don't forget that a living room in the winter can be as warm or warmer than many greenhouses and so you do not need to keep the plants so very dry under these conditions. Now I wonder how many of you have found out what I have described on more than one occasion, and that is, that most *Mammillarias* do not grow here during the hottest part of the summer. I noticed this many years ago and have had the same experience this year. As soon as we get a considerable amount of sunshine the plants just stop growing and then do not start again until towards the end of August or the beginning of September. I consider that this is quite a natural thing for them to do as they do not grow in the hot weather in their native habitat but just wait for the cooler rainy season. I will conclude with a good tip for the winter months, why not re-label all your plants and keep either a card index system or enter them all in a book with an individual number?

SOME SOUTH AFRICAN SUCCULENTS

By Miss W. M. A. BROOKE

I arrived at Cape Town at the beginning of September, 1936, intending to enjoy a year or more studying, photographing and sketching as much of South Africa's vast flora as was possible.

Most of my time was spent in districts having a fair or a heavy rainfall, but at different times I visited several of the more arid regions, while at the University of Stellenbosch I was shown the very fine collection of South African Succulents in the glasshouses of the Botanical Department. The glass, by the way, was needed to keep out rain rather than to increase the heat which was nearing 100 degrees F. outside. Sections had been arranged for plants from various dry districts, each with its own local rock, stones and soil. Entering the first house, I was struck by a thicket of *Pelargonium spinosum*, the whole plant covered with dead leaf stalks turned into prickles with spines growing from the leaf nodes.

There were a number of species of *Fenestraria* with their translucent windows at the top of each little shoot and yet more *Lithops*, exactly matching the stones amongst which they grow.

Much treasured were the two specimens of *Fockea capensis*; for many years only one plant was known which had been taken to Vienna, but Mr. Herre re-discovered it at Bergbarroe. *Fockea* has a large swollen underground stem like a huge turnip in which it stores its reserve of water; its stalk is long and straggly with small leaves.

There were several species of Bushman's Candles, *Sarcocaulon*, one of which had white blossoms. These plants secrete wax on the surface and, therefore, were used as lights by the natives.

A specimen of *Hoodia Bainii* was full of blossom, the flowers flesh colour with a little dark spot, but having an objectionable odour.

There were a large number of *Euphorbias* including the rare *E. stapeloides* and a number of *Aloes*, but some months later I stayed at Humansdorp when the *Aloes* were in blossom, great masses of plants such as *A. arborescens* with quantities of flowers like red hot poker (Kniphofia), or again a little valley filled with single, tall stems 4-5 ft. high, each topped by candelabra of a few huge flaming orange spikes. They have eliminated all cultivated *Aloes* from my mind.

In the open were some plants of *Welwitschia mirabilis* with just two long dilapidated leaves, interesting, but hardly attractive.

Large quantities of seeds had been sown on the surface of the soil in pots that were kept for about three weeks standing in a tray of water. Later on, tins, large and small, were frequently substituted for pots.

The South African section was but one division of the University's botanical garden and the Curator was anxious to enlarge the foreign part by exchanging plants with Botanic gardens in other lands.

Near by, at Bloom Erf, was Miss Stanford's nursery garden confined to South African plants. There I saw a magnificent border of *Cotyledon orbiculata* and *C. Flanaganii* in full blossom. *Cotyledons* have, usually, beautiful flowers and, wandering over the veld, I found several species. I stayed some weeks at Ceres, some 80-100 miles N.E. of Cape Town, and a very fine district for wild flowers, especially, perhaps, for *Ericas*, and, before leaving for the sub-tropical coastal region, I decided to pay a visit to the drought stricken Karroo. I was told that a lorry carried mail and supplies twice a week via Karroopoort to some isolated farms and at the farm school of Gansfontein one could put up for a day or two as a rule. Unfortunately, they had no telephone so there was no way of letting them know I was coming.

About 5.30 p.m. the lorry with seats for five passengers started off from Ceres loaded with drums of petrol, bulging sacks, boxes of fruit and of live chickens, some puppies and, underneath, a long pipe that projected about 10 ft. behind.

I was the only passenger, the driver could speak only Afrikaans and his assistant but little English. After a steep climb with a marvellous view of mountains and sunset, we stopped at a couple of remote post offices and, later on, to leave a letter under a stone at a side turning as we drove mile after mile over bare hard baked ground with dried up little bushes mostly of some species of *Mesembryanthemum*. Then, after 63 miles, we, at last, reached the school at 9.30 p.m. The lorry waited to make sure I was welcome and then drove on into the night. The family were in bed, but the master dressed hastily and came to find out the nature of the trouble, he had a bit of

a shock when he discovered a strange Englishwoman asking to be put up, but a room and tea were soon ready, sandwiches I had brought with me.

During term, 16 children lived at the farm : they came from white families whose homes lay within a radius of 30 miles or so, but which were too far away for them to come daily. The Government paid £2 10s. 0d. to £3 per quarter, according to age, for their board and all the parents maintained that they could not afford to add to that sum. The place had been an "outspan" or stopping place for wagons for many years and now, in addition to its permanent spring, it had a petrol pump and Mrs. Verster provided refreshments on the veranda, making it an outspan for cars. On the parched ground, little could be grown, but there were chickens, a small flock of sheep to provide meat, goats for milk and a few vegetables, mainly pumpkins of some variety and tomatoes.

Some distance beyond the house was the wide, completely dry bed of a river that occasionally became deep, powerful and dangerous. On its far side, the land was thickly clothed with succulents that, after the annual heavy rain, would be a blaze of colour. Low bushy *Mesembryanthemum* were the dominant genus with quite small thick leaves and thin dry branches and twigs. *M. Austonii*, on the other hand, crept along the ground and had vertical thick round leaves two or more inches long.

There were several *Crassulas*, *C. lycopodioides*, thin and straggly, another branched species and *C. columnaris*, a thick bulb-like bud with its neatly arranged brown leaves almost underground and rather ornamental *Ruschia* rambled over the earth. Dried up and almost buried was a clump of *Conophytum mundum* and near by *C. Menerae* with a few seeds. A species of *Caralluma* made a rather tired looking clump, but a dry brown stalk of *Pelargonium* had actually two little yellow flowers with red lines. *Euphorbia pseudobrachiata* grew taller, its purple stems having a pattern of green markings.

Here and there were tufts of the "Ostrich Grass," *Eragrostis spinosa*, with sharp spines and cutting edges.

Covered with dead skin and leaves, I found a plant of *Cotyledon paniculata*. To conserve moisture its short, round stem is swollen to several inches diameter, the leaves growing all round the upper part which is covered by a tough netting composed of the dry, forked stems of its former flowers—a very queer plant. This succulent vegetation has a fair amount of nourishment for the sheep and goats that feed on it. Although it can live for long periods, sometimes for years, without any rain at all, it is accustomed to an occasional very heavy rainfall when it lays in a fresh supply of moisture. During the drought much of it looks dead, but wet and warmth bring out such a profusion of blossom, that special trains are run to some districts to see it.

Mrs. Nevin, of Greenfield, California, has sent the Editor quite a collection of seed, including a considerable number of *Mammillaria* species, sent because of the Editor's interest in that genus, but she has also kindly sent other genera for members. These and all the *Mammillaria* seeds, except for a few taken for description purposes, are now in the hands of Mr. Boarder for distribution. Mr. Boarder tells us that it will take all his spare time during the winter cleaning and packeting them, but he will be ready on the 1st January, 1949. In addition to *Mammillaria*, there are seeds of the following :- *Ariocarpus*, *Astrophytum*, *Cleistocactus*, *Coryphantha*, *Dolichothele*, *Echinocactus*, *Echinocereus*, *Echinopsis*, *Escobaria*, *Ferocactus*, *Gymnocalycium*, *Hamatocactus*, *Lobivia*, *Lophophora*, *Malacocarpus*, *Neobesseyia*, *Notocactus*, *Parodia*, *Rebutia* and *Thelocactus*. Some packets only contain a few fruits and it is not practical to give a list of species. If you desire to participate in the distribution, please send stamped addressed envelope to Mr. A. Boarder, Marsworth, Meadway, Ruislip, Mddx., stating the genera in which you are interested. The seed will then be distributed at Mr. Boarder's discretion. The grateful thanks of the Society are due to Mrs. Nevin for her generosity and kindly thought for the difficult circumstances to which present events subject the members.

Captain H. J. Dunne Cooke is well known to us for his interest in scientific matters. He is generally very level headed and not given to rhapsody, but with a new discovery that has been brought to his notice, he is extremely enthusiastic and, after experimentation, he says that this new discovery "seems to be the succulent grower's dream" and we are sure that his comments are more than worthy of passing consideration. This new product is "Mortopal" (hexaethyl tetraphosphate). Our member informs us that it is absolutely and completely fatal to mealy bug and all forms of aphids, also red spider. Furthermore, it is quite harmless to plants even when immersed, pot and all, in the solution for ten minutes. The Editor has tried out the product and he can confirm Captain H. J. Dunne Cooke's information. He gave two applications by direct spray at a fortnight's interval and examination by magnifying glass does not show the slightest indication of life in the bug.

THE STUDY OF PLANTS AND COMMERCIAL OPERATIONS

By C. ELLIOT

With cactus collectors, two tendencies are observed ; first, the scientific culture enforcing the approach to plant types as nearly as possible ; secondly, the horticultural culture to obtain decorative plants with abundant flowers without worrying whether the plants approach the type or not.

To be quite candid, it must be humbly admitted that the scientific culture is an ambition and never a realisation. The causes are many. We know that everything living expresses an individual equilibrium plus the circumstances of environment. If, for some reason, the conditions of environment change, the equilibrium is broken. It is true that the organism can succeed to establish a new equilibrium, but if the environment changes it affects the metabolism and this is expressed in morphological changes. We see this for ourselves when we compare plants in our cultivation with those imported. In order to get a plant to resemble the plant type we must furnish for it conditions similar to those in its natural habitat. From the importance the scientific culturist attaches to the exact image of the plant type, it is necessary to provide a good description and it is also necessary to know the conditions of its natural environment, climate, sunshine, etc.

The study of cacti is not dated by the present ; several generations of authors have added their contribution in completing, verifying and rectifying the work of their predecessors. The last decade preceding the war was particularly fertile in this respect. Several travellers conducted explorations covering South America and as a result discovered a large number of new plants.

The commercial character of these explorations imposed upon the travellers the same methods; to obtain the highest possible yield it was necessary to undertake their journeys at a time when it was possible to collect plants and seeds at the same time. The collected plants were summarily packed and transported to Europe and it is in the greenhouses of Europe that the acclimatisation of the plants had to be done in order to provide for their following study, description and classification. To arrive at this end, it was necessary, not only to obtain the renewal of growth, but to achieve flowering and seeding. In basing ourselves on these facts, we can say, that the cultural methods of these explorers are the same as our own and that they are also ignorant of the physiology of the plants. The culture of the plants on their own roots is not always easy because we do not know their particular needs. In order to hurry along and make the work more simple, there is frequent recourse to grafting, but we can say that this is an abuse of the proper methods.

We already know by comparison with imported plants at which point our culture deforms the plants ; grafting often accentuates this deformation and may even render the plant unrecognisable. It is not difficult, in lieu of finding the cause of the phenomena, because we are ignorant of another reason, to find an explanation such as "the species has not yet had time to establish itself." All grafts are nourished by the vigour of the grafting stock which differs more or less from its own. The phenomena is comparable with laboratory experiments where plants are cultivated in a nutritive solution with the addition of an organic substance, such as glucose, which the roots can absorb and transmit to the body, provoking very distinct morphological changes.

Briefly, plants acclimatised and, above all, grafted plants lose the characters of the plant type and become simply horticultural varieties. The description of such a plant is not only doubtful, but it can give a totally inexact picture. This deplorable method promises a lovely mess when the exigencies of science demand a re-exploration of the same region. It will be impossible to identify the plants discovered previously and which are only known by the description of their horticultural varieties. Without pessimism it can be said that the work will have to be done all over again as a consequence of the confusion.

Scientific work should be placed on a sane footing and all study and description should be made from the plant types in their natural habitat. It is equally necessary that the descriptions are really complete, including their roots and all things of value, and not simply adopt methods called for by the present circumstances.

Each collector in the field jealously guards the secret of the site of his discoveries to prevent competition. They are not so ignorant not to know when it is important to note their exact sites. In that which concerns the efficacy of these precautions it is nothing but the proofs of simple mentalities ; you and I do not go to collect these plants, those who are able to organise these expeditions, they do not go to find these plants, but to find something of value. This shows a want of scruple and of clairvoyance.

We sometimes speak of difficult plants, but this is a bad way of expressing it ; there are no difficult plants, but there are a few bad plants of which we are ignorant of their particular requirements and it is for this reason that their culture does not succeed or succeeds rather badly. There are innumerable errors following on the ignorance of the conditions of their natural habitat proper to such and such a plant.

A good description of plants is not completely sufficient; an organism and its natural habitat are an indivisible whole, that is why it is indispensable to indicate all information that characterises it, geographical situation, climate, sunshine, altitude, etc.

Are there any means of enforcing these conditions? Certainly there are—it is to refuse the confirmation of a discovery if the description of the plant and its natural conditions do not respond to the requirements enumerated above.

There is yet another thing which should be approved by collectors, something which does not cause direct damage—viz., the nomenclature of the plants.

Usually the name of a plant indicates one or other of the characteristic traits of its place of origin. Sometimes, to render homage to the merits of a scientist the plant is dedicated to him. We agree if it is to recognise services rendered by that person (such as *Carnegiea gigantea*), but why commence to immortalise the merchants of cactus, the presidents of cactus societies, or all the people who have contributed to the commercial prosperity of such and such an explorer, in that case we must dispute it.

The cactus organisations are sufficiently strong to make known their opinions and to disavow these doubtful proceedings which are quite useless to the good development of sane study of cacti.

In the illustration pages will be seen photographs of the June Exhibition by Mr. R. H. West. These photographs came too late to be inserted in the July number. One, practically a duplicate of the one that did appear, has been omitted, but the others give some idea of the individual exhibits.

The competition for the Sherman Hoyt Cup, held at the R.H.S. Show, September 7th and 8th, was won by Captain H. J. Dunne Cooke and Mr. P. V. Collings was placed second.

When requiring anything to do with our plants, we trust that members will deal with firms advertising in the Journal, as these advertisements are collated as much in the interests of members as an economic alleviation of printing costs. Always mention the Journal when you write to advertisers.

We purposed that this number of the Journal would appear without reference to the unfortunate differences that have arisen, but Mr. Roan has been at it again. He states we said, in 1945, "that a resuscitation of the old Society was most unlikely," and "expressed serious doubts regarding re-juvenation of the Society." He knows full well that this is not true. The reply was that owing to bombing, evacuations, etc., it would be difficult to get the members together again. The support given to him then was for the formation of a Branch, not a competitive, pirate society.

If you hear of a cacti and succulent collection for sale, please let us know. In these days of difficulty, members greatly appreciate the opportunity of obtaining plants.

CONOPHYTUM N.E. BR. (continued)

By H. HERRE

Species without spots.

- C. concavum* L. Bol. (concave). Riethuis, Hondelikipbay. Bodies very soft and velvet hairy. Flowers light yellow.
C. Fulleri L. Bol. (in honour of E. R. Fuller). Kakamas. Flowers rose.

Species with bodies hidden for a long time under white papery sheaths.

- C. ectypum* N.E. Br. (not like the type). Steinkopf. Flowers yellow.
C. virens L. Bol. (greener). Richtersveld. Flowers rose, otherwise resembling *C. ectypum*.

Sub-division ; Subrisum. Points of bodies a little cone-like and towards the split a little deepened.

- C. Forresteri* L. Bol. (in honour of H. J. Forrester). Nieuwefontein, distr. v. Rhynsdorp. Flowers yellow.
C. longipetalum L. Bol. (long petals). Alwynsfontein, v. Rhynsdorp. Flowers golden yellow.
C. subrisum N.E. Br. (nearly ridiculous). Atties, v. Rhynsdorp. Flowers yellow?
C. Villetii L. Bol. (in honour of Dr. A. C. T. Villet, Cape Town). Nieuwefontein, v. Rhynsdorp. Flowers yellow.
C. percrassum Schick et Tisch. (always fat). Steinkopf. Flowers yellow.
C. Poellnitzianum Schw. (in honour of the late Dr. K. v. Poellnitz). Namaqualand. Night flowering species with an agreeable scent. Flowers whitish yellow.

Sub-division: Calculus : with fairly hard, whitish epidermis.

- C. breve* N.E. Br. (short). Steinkopf. Flowers ?
C. calculus N.E. Br. (globular or pebble like). Knersvlakte, v. Rhynsdorp. Flowers yellow.
C. Vanzijlii L. Bol. (in honour of G. v. Zijl). Pofadder. Flowers yellow. Much like *C. calculus*, but smaller.

Species with window.

- C. pellucidum* (N.E. Br.) Schw. (translucent). Ookiep, Springbok. Flowers white. Bodies brown like the Karroo soil.

- C. lithopoides* L. Bol. (*Lithops* like). Pofadder, Bushmanland. Flowers yellow.

Species forming a link between *Eu-conophytum* and *Biloba*.

- C. approximatum* Lavis. (nearby). Groot Mis near Kleinsee, Namaqualand. Flowers?
C. Meyeri N.E. Br. (in honour of Rev. G. Meyer, Steinkopf). Steinkopf. Flowers yellow.
C. polyandrum Lavis. (many stamens). Kurkam Mts., near Kommaggas. Flowers rose.
C. ramosum Lavis. (ramified). Kurkam Mts., Kommaggas. Flowers yellow.

2. *Biloba*

Species with large and middle-sized smooth bodies.

- C. altum* L. Bol. (high). South of Brakfontein, Richtersveld. Flowers yellow.
C. amplum L. Bol. (noteworthy, broad). Vlakmyn, Richtersveld. Flowers yellow.
C. andausanum N. E. Br. Andaus Poort, Ananeus, Namaqualand. Flowers yellow.
C. angustum N.E. Br. (narrow). Namaqualand. Flowers yellow.
C. biloba N.E. Br. (two lobes). Richtersveld. Flowers yellow.
C. convexum L. Bol. (convex). Nuwe myn, Richtersveld. Flowers light yellow.
C. cordatum Schick et Tisch. (heart shaped). Port Nolloth—Aneneus. Flowers yellow.
C. densipunctum (Tisch) L. Bol. (many spots). Karas Mts. and Warmbad, S.W.A. Flowers?
C. difforme L. Bol. (deformed). Remhoogte, Richtersveld. Flowers yellow.
C. Edwardsiae Lavis. (in honour of Mrs. G. Edwards). Warmbaths, Clanwilliam. Bodies with red dots and stripes. Flowers light red.
C. frutescens Schw. (half shrubby). Kommaggas. Flowers yellow.
C. klipbokbergense L. Bol. Klipbokberge, Richtersveld. Flowers yellow.
C. Lavisianum L. Bol. (in honour of Miss M. Lavis, Cape Town). Between Kommaggas and Meskraal. Flowers yellow.
C. lekkersingense L. Bol. Lekkersing, Richtersveld. Bodies have translucent spots. Flowers yellow.
C. leucanthum Lavis. (white flowers). Steinkopf. Flowers white.
C. linearilucidum L. Bol. (translucent stripes). Tussenin Mts. Richtersveld. Flowers golden yellow.
C. Luckhoffii Lavis (in honour of Dr. J. Luckhoff, Cape Town). Near Citrusdale. Bodies with dots and lines. Flowers golden yellow.

- C. longibracteatum* L. Bol. (long calyx lobes). Sand Mts., Kommaggas. Dark green dots along points of bodies form lines. Flowers yellow.
- C. Meyeræ* Schw. (in honour of Mrs. G. Meyer, Steinkopf). Steinkopf. Flowers yellow.
- C. Nelianum* Schw. (in honour of Prof. G. C. Nel). v. Reenenswater, Kommaggas. Flowers yellow.
- C. nutaboiense* (L. Bol.) Tisch. Nutaboi, Buffelsriver, Namaqualand. Flowers yellow.
- C. Pole Evansii* N.E. Br. (in honour of Dr. I. B. Pole Evans). Twenty-eight miles east of Port Nolloth. Flowers yellow.
- C. salmonicolor* L. Bol. (salmon). Kurkam Mts., Kommaggas. Flowers salmon.
- C. Smithersii* L. Bol. (in honour of R. Smithers). Steinkopf-Eenriet. Flowers yellow.
- C. subtenue* L. Bol. (nearly thin). Steinkopf. Bodies have green spots. Flowers yellow.
- C. vlakmyense* L. Bol. Vlakmyn, Richtersveld. Flowers yellow.
- Species with large and middle sized bodies which are velvety hairy.**
- C. albescens* N.E. Br. (becoming whitish). Richtersveld. Flowers yellow.
- C. bicarinatum* L. Bol. (two wedges). Ceres. Flowers light yellow.
- C. blandum* L. Bol. (charming). Geselskapbank, Bushmanland. Flowers light rose.
- C. citrinum* L. Bol. (lemon). Kubus, Richtersveld. Flowers lemon yellow.
- C. Conradii* L. Bol. (in honour of Conrad Herre, Dessau). Breckpoort near Steinkopf. Flowers light yellow.
- C. latum* L. Bol. (broad). Kubus, Richtersveld. Flowers yellow.
- C. muscosipapillatum* L. Bol. (moss like hairs). Sand Mts., Kommaggas. In course of time lose the moss like hairs. Flowers yellow.
- C. noisabisense* L. Bol. Noisabis, Hellskloof, Richtersveld. Flowers yellow.
- C. piriforme* L. Bol. (pear like). Kubus, Richtersveld. Flowers yellow.
- C. puberulum* Lavis (long hairs here and there). Richtersveld. Flowers yellow.
- C. regale* Lavis (royal). Ratelpoort, Ookiep. Flowers royal rose.
- C. semivestitum* L. Bol. (half covered). Jakkalswater, Bushmanland. Flowers rose.
- C. strictum* L. Bol. (straight). Hytkovas, Bushmanland. Flowers yellow.
- C. subacutum* L. Bol. (nearly pointed). Hangpaal, Steinkopf. Flowers yellow.
- C. velutinum* Schw. (velvet like). Kommaggas. Flowers dark rose.
- Species with small bodies.**
- C. eenkokerense* L. Bol. Eenkoker, Bushmanland. Bodies pointed, flowers rose.
- C. hians* N.E. Br. (yawning). Lekkersing, Richtersveld. South of railway, Port Nolloth—Ookiep. Bodies velvety. Flowers copper red.
- C. haramoepense* L. Bol. Haramoep, Bushmanland. Bodies dotted. Flowers yellow.
- C. laetum* L. Bol. (full of joy). Wildeperdehoek, Kommaggas. Bodies velvety. Flowers yellow.
- C. Luisæ* Schw. (in honour of Miss Luise Meyer, Steinkopf). Karrachab and Lekkersing in the Richtersveld. Bodies with few dots. Flowers yellow.
- C. marginatum* Lavis. (red lined margins). Pofadder. Flowers rose.
- C. modestum* L. Bol. (humble, modest). Sendlingsdrift, Richtersveld. Flowers whitish.
- C. parvulum* L. Bol. (very small). Richtersveld? Bodies show dark dots. Flowers yellow.
- C. Primosii* Lavis. (in honour of R. Primos, Cape Town). Mesklip, Kommaggas. Flowers white.

NORTH KENT BRANCH. The Branch held its first meeting on Thursday, 9th September, 1948, at 17 Overcliffe, Gravesend. Meetings are held regularly on the second Thursday of every month, time, 7 p.m., place as above. The Branch wishes to thank the R.A.F. Association, Gravesend Branch, for allowing the use of the room at their headquarters for meetings.

On Saturday, 28th August, four of the Branch members paid a visit to an old member of the Society who, alas, is no longer a member although he still has a large and varied collection. He is Mr. G. Lamb, of Hextable, Kent, late of Kew and Cambridge Botanical Gardens. A very interesting afternoon was spent in his glasshouses and the members came away well satisfied with their afternoon. Mr. Lamb also very kindly gave them a few plants.

Will members of the Society, interested in the Branch, please write to the Hon. Branch Organiser, 75 Portland Avenue, Gravesend, who will be pleased to send them details of meetings, etc.

STAPELIEAE

By G. G. GREEN

One day in August, I was discussing with a friend the vagaries of the genus *Stapelia* and so engrossed did we become in our talk that most of the afternoon passed quickly away before we realised that we had not even seen the rest of his collection. In all that time, we had been talking only of *Stapelias* and I realise now how much one could write of this particular member of the *Asclepiadaceae* family without touching upon the near relations, the *Hoodias*, *Tavaresias*, *Trichocaulons*.

It would certainly take up too much space in this issue of the Journal, but I believe there are one or two salient features that might be of interest to the reader which can be dealt with in this article as a preliminary introduction to the Family as a whole.

In the first place, a knowledge of the habitat of these plants would help to give an idea as to the conditions of living to which the *Stapelias* are accustomed. The different members of this huge family come from widely scattered countries and districts, with a consequent variety of climate, soil, flowering or resting periods. The *Stapelias* are native to South and S.W. Africa, though a few grow in the tropical zone of Africa and some even in the East Indies.

The Great Karoo Desert, home of the *Pleiopilos*, *Faucaria* and other *Mesembryanthemums*, is also the home of the *Stapelias*. Here, during the summer months, the plants receive what rain falls in this district from November to April and soon afterwards produce their abundant flowers. In Namaqualand, S.W. Africa, this rainfall period lasts from November to March only, with a consequent difference in the flowering period of the plants. It should not be assumed, of course, that rain falls continually during these months, for the reverse is often the case. Compared with our own wet island, the rain in these districts is often negligible, but it is, nevertheless, sufficient to enable the plant life living there to absorb enough moisture to last them through the dry season, with the help, usually of considerable night dews.

It is in the Karoo districts that the difference in form of the various succulent plants becomes noticeable. The cylindrical and columnar forms begin to give way to more rounded, dwarfer and compact shapes, indicating the change from comparative wetness to extreme drought. Nature compensates for the greater amount of sun by giving the plants a shape that exposes as little surface as possible to the burning rays. Thus there is the difference in structure of the giant columnar forms of the *Carallumas*, *Trichocaulons*, *Hoodias*, etc., from that of the dwarf cylindrical and oval forms of the *Echidnopsis*, *Huernia*, *Duvalia*, etc.

Our problem, then, is how to grow these plants in our climate and under the abnormal conditions of the ordinary greenhouse or front room window ledge. In this article I am not going to say that what I write indicates the only way they should be grown and cultivated because I know only too well that many collectors have their own views about the subject and each will acclaim his own method as being the best. That might well be for a given set of conditions and district, but it is only through long experiment that one can really find the best way of growing these plants. For the guidance of those of us who have not had the chance to experiment over a long period, these notes will, I think, enable one to ensure a great amount of success.

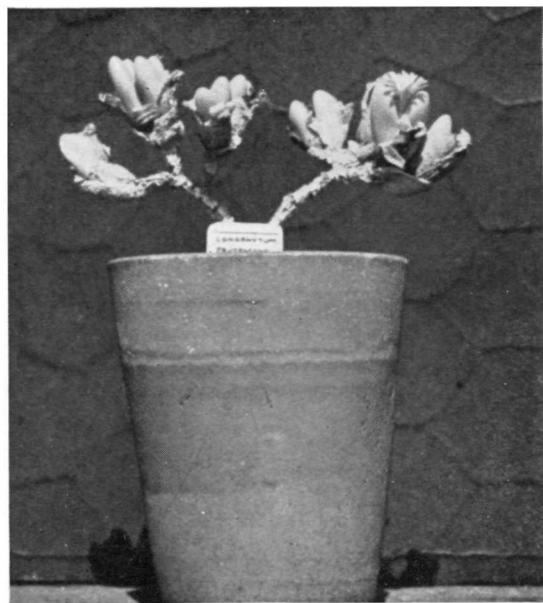
We can gather, then, from the geographical position of their native homes that the *Stapelias* like sunshine, if it is accompanied by a maximum of fresh air and a free circulation of it, but under glass or in a house window, too much sun, in conjunction with a close atmosphere, can be harmful. It is best, therefore, to place the pots where the midday sun of our summer does not fall directly on the plants, but where they can receive its benefit during the rest of the day. Generally, this can be arranged by placing the pots amongst taller growing subjects such as *Euphorbia splendens*, *E. canariensis*, etc. If the pots are sunk in gravel or sand, the roots will be kept cool and the plants can bear a greater amount of sun, whilst the watering problem is less acute also.

Stapelias need a fair amount of water during the growing period, though care must be taken to see that the pots are never waterlogged and that they soon drain out. In the winter only sufficient water to prevent the roots from drying right out is necessary, and this can be done, say, once a fortnight and on a bright day. When bedded in gravel, no water at all need be given until the commencement of the growing period. Some members of the *Stapelieae* Family, such as *Hoodias* and *Tavaresias*, for instance, need no water whatsoever, whether sunk in gravel or not, during the winter. It is important that the plants do not receive too much water during the summer months, however, as this tends to make the stems grow longer than is natural, with a consequent weakening, lack of form and paleness of colour. Flowers will, it is true, be encouraged by watering, but sudden sunshine will cause the



Conophytum fissem

H. Herre



Conophytum frutescens

Captain H. J. Dunne Cooke



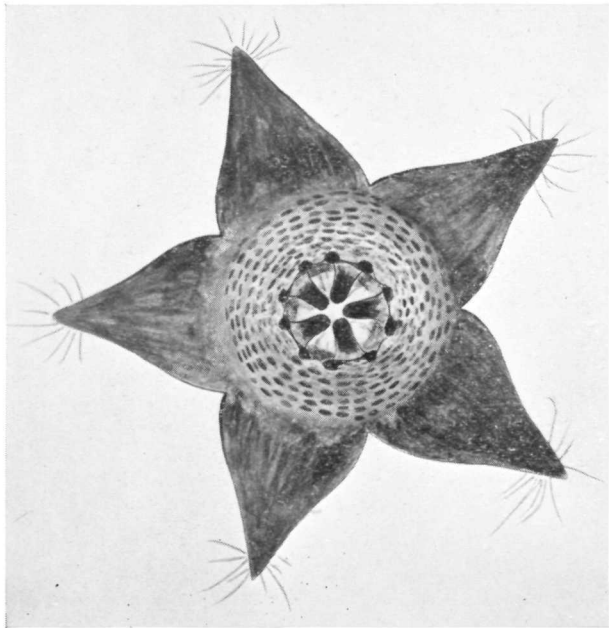
Exhibition, June, 1948

R. H. West



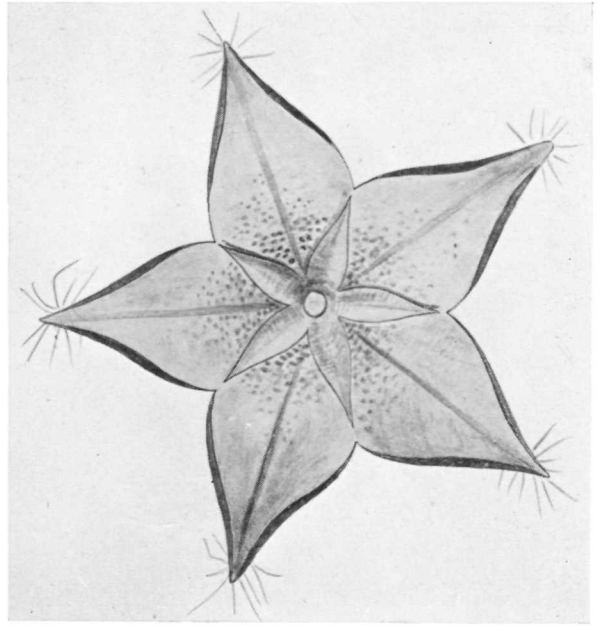
Exhibition, June, 1948

R. H. West



Caralluma Joannis
flower top

J. Gattefosse



Caralluma Joannis
flower, underside

J. Gattefosse



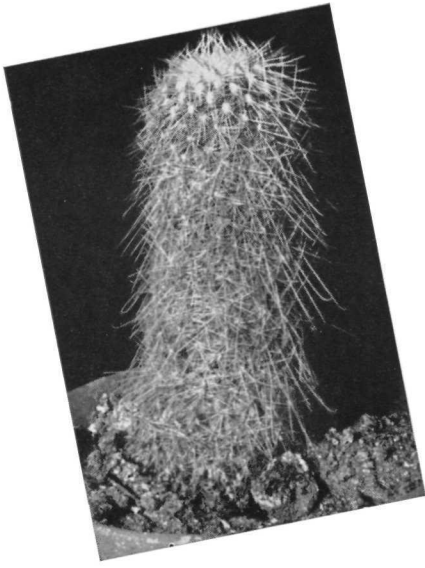
Aoulouz habitat *C. Joannis*

J. Gattefosse



Vermiculite

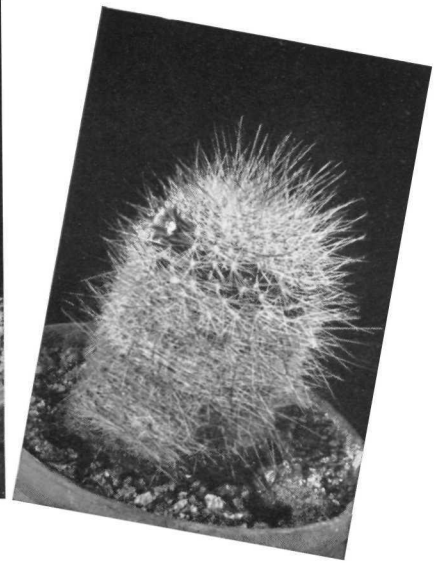
S. R. Mullard



M. guerreronis subhamatam

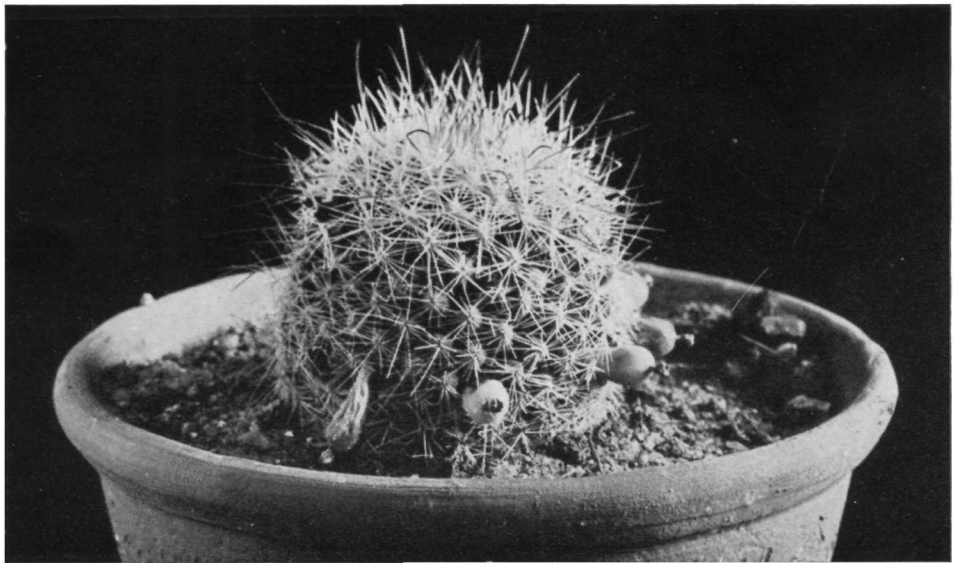


M. Deliusiana,



M. zapilotensis

E. Elkan



Mammillaria Deliusiana

E. Shurly



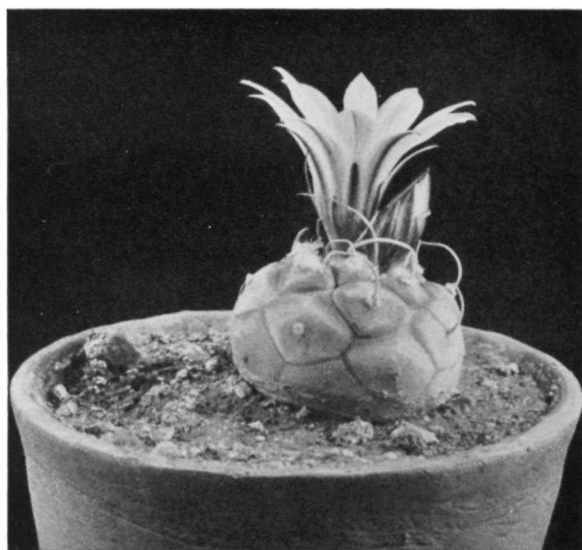
Huernia hystrix

G. G. Green



Stapelia group

G. G. Green



Strombocactus Schwarzii

E. Shurly



Strombocactus Schwarzii

E. Shurly

stems to grow limp and, in some cases, to droop into the soil where the tip penetrates to hide from the sun. Some *Carallumas* have this tendency to penetrate the surrounding soil with the tips of the stems, but for a different reason than that stated above, which I will endeavour to explain later on.

Too much shade will also cause long stems that are thin and weak and have no colour, so should any plant look straggly with these thin elongated stems and a pale greenish yellow colouring, it can be assumed that too much water has been given, or the plant wants more sunlight and is in too shady a position. It should then be easy to decide the cause and to take the necessary steps to alter it. If watering was the cause, do not cut it off for too long, but gradually lessen the amount and frequency until a regular time table has been reached that suits the plant, governed, of course, by weather conditions. It must be remembered that *Stapelias* are accustomed to long periods of drought and that over-watering, especially out of season, is against the natural needs of the plant and is almost sure to do harm.

Sunshine will bring out the true colourings of the stems and ripen the tissues in preparation for the winter months to come. If the stems are firm and healthy and of good colour, then the conditions of place and watering are obviously suitable and should be continued, a note being taken of the necessary details for future reference.

Most *Stapelias* flower during our summer months, especially in August; the flowers being produced either singly or, if the plant is very robust, two or more together, lasting for several days. Flowers are usually formed on the young stems of current growth, towards the base of the plant, and have a distinctly unpleasant odour, but the brilliance and variety of the colouring make up for this which, unless one puts one's nose right near the flower, can pass unnoticed. The smell is one of the ways in which the plant attracts flies so necessary to fertilisation and usually it is the blue bottle which finds the open flower, wherein it lays its eggs. The brilliant colourings and hairy corolla are also media for the attraction of flies and, in some members of the *Stapeliaceae*, such as *Huernias*, the hairy lower portions of the corolla form a trap which keeps the fly imprisoned until the flower withers, so making sure of pollination. Stronger flies, upon getting the tongue caught up in the hairs, jerk loose with pollen attached and fly to other flowers, fertilising them at the same time.

Stapelia flowers are five-parted with spreading triangular petals or lobes, coloured with rich tints of purple, red and gold, very fleshy and thick and, sometimes, with hairs on the insides. They are very attractive and wonderful, especially in the species *S. gigantea*, where they reach a size of some ten or twelve inches in diameter.

When the buds are about to open, it is better to elevate the pots so that the flowers do not rest on the soil or on other pots which may be near, as woodlice and other insects, attracted by the smell, will enter the corolla and eat away the tissue. Do not pick the flowers, or damage them in any way, because, if fertilisation has taken place, the seed pods will begin to form early next season. These are attractive, very long tapering pods usually formed in pairs and, when ripe, will burst open, spilling the seeds into the air in a cloud of silver down. The seeds are attached to silky, feathery membranes similar to those of the dandelion and will float about in the lightest breeze. They should be collected and dried for sowing later on.

A good soil mixture for general use, is one pint fibrous loam (from the turf stack), one pint old leaf mould, one pint very coarse sand and the addition of a handful of broken charcoal and old mortar rubble to every small bucketful will benefit the plants. It must be borne in mind that good drainage and a porous soil are essential and it is a wise plan to sift the finer particles of the mixture away, leaving only the residue for potting. It will be found best, I believe, to re-pot *Stapelias* every second year, when examination of the roots for pests and division of the plants can be carried out. The fresh soil will encourage robust, healthy growth.

Propagation is usually by cuttings or division of the plants when re-potting. Cuttings should be taken of the current year's growth, cut close to the stem and allow to dry well before placing in the compost of coarse sand and peat. I always take them in summer, of young healthy shoots, placed, when dry, in a rather moist mixture of the compost under a bell jar or ordinary 2 lb. jam jar. This keeps a constant warm atmosphere and soon encourages root formation and losses by shrivelling or damping are very small.

Seeds can be sown at any time when warm conditions are prevalent and, after ripening, using a compost of sandy peat similar to that used for cuttings. Germination is usually very quick and, when about half an inch tall, the seedlings should be pricked off into a pot or pan to prevent damping or rotting as they are very susceptible to this disease when young. Dampness is sure to rot even old specimens unless the plants have good drainage and a free circulation of air. Growing from seed, though most interesting, is not to be advised unless one can be sure that the seed is true to name. *Stapelias* cross-fertilise very easily and true species will be rare amongst one's own seed unless every care has been taken over the pollination—a most difficult business.

(to be continued)

THE USE OF "EXFLOR" HORTICULTURAL VERMICULITE FOR SEEDS AND CUTTINGS

By S. R. MULLARD, M.B.E., M.I.E.E.

Vermiculite was found purely by chance, like many other horticultural aids. A miner lay his lamp on a ledge, and the heat of it caused small particles of mica, on the roof of the tunnel to expand slightly, he noticed this and reported it to his foreman. Research began, to find a use for this "puffed mica" and the Americans became interested, some of the earliest trials, as a rooting medium, were carried out in the United States Department of Agriculture.

Although Vermiculite is found in many parts of the world, large deposits in South Africa supply much of the demand. Vermiculite is now extracted from a mica bearing ore as small scales of which there are as many as one million to the inch. These scales are heated to a temperature of 2000 degrees F. when the moisture content is converted to water vapour which expands the ore up to ten times its original volume. "EXFLOR" Vermiculite is a grade specially refined for horticultural use. There is another type of Vermiculite which, owing to its extreme alkalinity is useless for horticulture, but has proved very useful to the building and other industries.

Vermiculite is useful to horticulture as a rooting medium for raising seeds to the advanced seedling stage and for the propagation of plants from cuttings. There are reasons why this new rooting medium is better than soil or sand for the purpose. It is essential, for the best development of the plant, that one should follow nature as closely as possible. When lifting plants for transplanting, or potting from soil or sand, either as seedlings or rooted cuttings, many root hairs and even branch roots are broken off, this would not happen in the natural life of the plant. The wounds so caused give ready entry to disease and insect attack and use up the plants energy in its efforts to replace the severed roots. Vermiculite is extremely light in weight and, it is difficult to cause damage by fracture of roots when handling. The "EXFLOR" should be allowed to partially dry out before the plants are lifted, when a proportion of the medium falls away, the particles which adhere to the roots are allowed to remain. (See photographs inset).

There is no "check" in nature comparable to that suffered by plants in transplanting, but plants raised in Vermiculite show no check owing to their very large undamaged root system.

"EXFLOR" Vermiculite provides an open, fully aerated medium combining retention of moisture, absorbed on to the tremendous surface area of each particle of mica thereby storing readily available water or nutrient solution for the plants, with good drainage, since the particles are only loosely packed. "EXFLOR" should not be squeezed or pressed since this will flatten the "puffed" particles and thus reduce the full benefit of aeration. It may be kept quite easily in the barely moist condition so essential for cactus and succulents at certain times of the year.

As an indication of the rooting properties of "EXFLOR," the following are some difficult subjects which have been successfully rooted: *Hybiscus syriacus*, *Buddleia alternifolia*, *Amorpha californica*, *Cydonia laganica*, *Cytisus albus*. Sweet pea cuttings are rooted in 14 days, increasing the number of plants from these expensive seeds.

There are two grades of "EXFLOR." Grade "A" is fine in texture and is recommended for very small seeds, three pounds of this is sufficient to fill a standard 2½ inch box. Grade "C" is recommended for germinating large seeds and rooting cuttings. "EXFLOR" should be three to four inches deep for cuttings, which should only be planted to a depth which is just sufficient for their support. One and a half pounds Grade "C" is sufficient to fill a standard 2½ inch seed box.

To germinate seeds the "EXFLOR" should be placed in an enamelled iron or wooden bucket keeping some aside for covering the seeds. One tablespoonful of any good general fertilizer powder should be dissolved in one gallon of water and stirred thoroughly. After allowing it to settle, the clear liquid should be decanted over the "EXFLOR" until saturated. The period for saturation is eight to twelve hours, after which the Vermiculite is ready for use. The seed box should be filled to within three-quarters of the top, the seeds sown and covered with a layer of dry "EXFLOR" and very gently patted with the back of the hand until the surface is damp.

The medium must always be kept moist, it contains very little plant food and the general fertilizer powder is not suitable for feeding plants beyond the advanced seedling stage.

To propagate cuttings the "EXFLOR" is saturated with clean water only before use, no fertilizer is necessary. After the cuttings are inserted, they should be given a liberal watering with a fine rose. Generally only a light watering is necessary every fourteen days after the initial soaking. The acidity of the medium depends largely on the lime content of the water used. "EXFLOR" Grade "C" tends to decrease alkalinity slightly.

"EXFLOR" may be used several times. For safe results sterilization is recommended between each batch of cuttings. To sterilize, it is washed in water then heated in a bucket until steaming freely.

Having read with interest the article "More notes on Cacti from Seed," by A. Boarder, in the Journal for March, 1948, I note that seeds of Cacti should be sown on top of a fine porous soil. Grade "A" or Grade "C" "EXFLOR," according to the size of the seed would seem advisable for this purpose, the enlarged and undamaged root system obtained should ensure a good plant raised from seed. Cuttings of *Cereus* and *Phyllocactus*, for example, should also root extremely well in "EXFLOR" Grade "C" Horticultural Vermiculite.

HOW I BEGAN MY CACTI COLLECTION

By Mrs. M. STILLWELL

About sixteen years ago, a girl friend showed me her collection of cacti and succulents filling every window sill in the house. One day, consternation arose over the discovery of an empty pot, the offending cactus was finally discovered caught up, by its long hooks, in a curtain her mother had pulled back in the morning.

One day she suggested that I started a collection and, that evening I proudly bore home *Kleinia articulata* (Candle Cactus). I kept it on my dressing table and, of course, owing to insufficient light, it became a long tapering growth, which I had to loop up when about 18 inches long. I sensed something was wrong, so, having collected other specimens and our window sills being narrow, I erected a series of small wooden shelves, like a miniature staircase. This, my first attempt with hammer and nails, amused my parents, but I finally achieved my aim; there, blocking up all the window space, was my collection, much to mother's annoyance! Watering was done standing them in a large meat dish until the water came to the surface of each pot.

When I married, the collection and my contraption of shelves was re-erected in the window of a large attic in my new home, which got very hot during the summer, and several cacti developed mealy bug and I lost them. I was disheartened.

The following year we built our own house and I bought a small greenhouse, getting a tremendous thrill watching my cacti growing healthier every week. When the first flowers appeared, I popped into the greenhouse almost every half-hour to see if each bud had opened.

In winter, I had a small oil heater which just about kept frost out. My collection grew and I soon needed a larger greenhouse. While this was building, I had my plants (over 300) in the sitting room—I shall never forget it! The new greenhouse was wired up with tubular electric heaters, thermostatically controlled to cut out at 50 degrees. The cable was taken along the fence and under the dining room floor to a switch fixed on the skirting next to the wireless plug. This system has been working for a number of years without attention.

My collection now numbers about 500, but my favourites are stemless *Mesemb.* I have no luck with *Opuntias* as top pads always shrivel, why? I have had some cacti over 15 years including *Cephalocereus senilis*, *Trollii*, *Celsianus* and *Espostoa lanata*, still looking beautifully clean and fresh. *Lobivias* and *Rebutias* can be relied upon for a fine show of flowers in the summer; quaint *Ceropegia stapeliiformis* is a favourite with its greeny white "umbrella" flowers; *Glottiphyllums* bloom most of the winter; *Echeverias* are among the first to greet us with flowers in the spring. *E. carnicolor*, *setosa* and *Weinbergii* are all coming into bloom—easy to grow, they always look clean and fresh; never spray them as it spoils the delicate bloom on the leaves; *Gibbaeum pubescens* has five flower buds, I see; this is the first time, so I am quite excited. What an uplift one gets from the first flower on a favourite plant. A visit to my greenhouse early on a summer morning puts me in a good frame of mind for the day.

My greenhouse has a concrete floor and each side, under the staging, is a six-inch pit filled with sand, kept damp during the summer for cuttings which I find quickly root. I have been unsuccessful with seeds, not having the right conditions and heat. This year I hope to have another small greenhouse solely for this purpose. If I can in time, I hope to compete with others more experienced in the art. Last year was my first visit to the show. I did not exhibit as I imagined that to qualify for prizes one had to have huge specimens; now I realise it is quality, not quantity, that counts. This year I hope to show; the difficulty is transport; I shall enlist the aid of my husband and, between us, we will stagger to Vincent Square heavily laden. It is necessary to learn the habits and treatment of every plant you have, to achieve anything like success. Most important is the correct resting and watering periods. I see now I lost many plants, in the early days, by watering at the wrong times. Grow slowly and surely; never overdo watering, never use fertilisers.

I brought four plants to the Table Show last year, *Pleiospilos Bolusii*, *Fenestraria aurantiaca*, *Espostoa lanata* and *Echinocactus Leninghausii* which Mr. Boarder said were well grown. This gave me a feeling of satisfaction, for if you can get by Mr. Boarder, you can get by anyone!

The New Zealand Cactus Society is having a Special Issue of their Journal in December when it will be printed and illustrated. It will contain articles of general interest and of particular interest to overseas readers will be an article on the New Zealand native succulents, information gathered from a field study trip by their members. Members wishing to obtain a copy should send 1/6 to Mrs. P. D. Bruce, Crampton Acre, Seabrook Avenue, New Lynn, Auckland, S.W. 4, N.Z.

LITHOPS AURANTIACA L. Bol.

By O. HOEVEL

This species was discovered by the farmer and succulent fancier, Wilhelm Triebner, in South Africa at a site 80 kilometers south of Luderitzbucht, in the district of the Diamond Mines and was first described by Dr. Louisa Bolus (Notes on Mesembryanthemum 2; 344). The name is derived from the colour of the flowers.

It has always been extremely rare in Europe, and has never been in the Kiel Collection, nor, as far as I know, in other German, or in Dutch collections. Mr. Swuste states (Succulenta 37; 26) that he received seed from South Africa in 1936 and that nearly 80 per cent. germinated, but the seedlings lacked chlorophyll and soon died.

At first sight, it strikingly resembles *L. turbiniformis* (Haw) N.E. Br., and is, probably, not different from that species. The colour and shape of the bodies are the same and their surfaces are wrinkled in the same manner, the furrows being a somewhat deeper colour than the elevations. When carefully compared, the first descriptions show no essential difference, nor do their flowers. On the other hand, the statement by Dr. Bolus, that the flowers of *L. aurantiaca* open all day in full sunshine, is striking. This is, as far as I know, unique in the genus, flowers generally open only in the afternoon, but this peculiarity is hardly sufficient to justify separate specific rank for *L. aurantiaca*.

One might plead that the two species cannot be the same as their natural habitats are many hundreds of kilometers apart, but this cannot be decisive, as I have explained in my article "Separation of *Lithops* species" (Cactus Journal 1947; 78). The distance between the natural sites of *L. turbiniformis* in the Eastern Karoo, near Somerset East, and in the Ceres Karoo, near Bokkeveld, is also many hundreds of kilometers apart, but, nevertheless, we have the same species in both places.

(An illustration of *L. turbiniformis* will be found in the right of the photograph on page 14 of the January Journal.—Ed.).

It is interesting to refer to what Dr. Nel has to say in his recent monograph "*Lithops*," page 151. Ed.

"I have included *L. aurantiaca* Bol in *L. turbiniformis*, as there does not appear to be any difference between these two species. *L. aurantiaca* was sent to the Botanical Garden University, Stellenbosch, by Triebner in 1930. In April, 1932 it flowered and was then described by L. Bolus. In the description she states 'crebre impressa rugosaque fere in more *L. turbiniformis*,' but, unfortunately, she does not state in what specific point or points these two species are supposed to differ from one another. The original plants from which the description was made of *L. aurantiaca* were painted under the impression that *L. aurantiaca* was a distinct species. When the question, however, of making a key came up, it was impossible to find any difference between *L. turbiniformis* and *L. aurantiaca* L. Bol., to warrant the upholding of the latter.

"It is true that if reference be made to the photograph of *L. turbiniformis*, reproduced in Gard, Chron. Feb. 4, 1922, p. 55, Fig. 28, it appears that the tubercles are very prominent and definite, but my own experience of this species both in the field and in cultivation, is that one cannot attach too much importance to the degree of rugosity. The leaves, especially in the young stage, show a very prominent tuberculation, but towards the end of their life, the upper surface becomes smoother, the depressions (furrows) shallower, until one has just more or less an indication of a more deeply coloured line.

"At first I was at a loss to account for the appearance of *L. turbiniformis* in the Klinghardt Mts., hundreds of miles from Prieska, the nearest point, where this plant occurs, to the above mountains. Apart from this, the climatic conditions on the West Coast of South West Africa are entirely different to those where the plant normally grows (Prieska, Britstown, Kraankuil). One of two explanations is possible: (1) If it does really grow in the Klinghardt Mts., then it is the only case, where a species of this genus had so to say jumped hundreds of miles and that is something quite unusual in this genus; (2) the more plausible one is that W. Triebner must have made a mistake in the habitat of the plant he is supposed to have sent to the University of Stellenbosch. I am strengthened in this latter view by the fact that Herr Eberlanz, Luderitzbucht, who knows that part of the country very well, wrote me as follows: "Ich kenne den Fundort von *L. aurantiaca* nicht, glaube aber nicht, dass diese Art aus dem Klinghardtgebirge stammt. Nach Professor Dinter, welcher 1923 dort sammelte, ist wohl kein Sammler dort gewesen. Da die Consolidated Diamond Co. dieses Gebiet hermetisch verschlossen hielt, besteht keine Möglichkeit dorthin zu gelangen."

"It appears that the plant No. 9180, which is the type, was sent by Max Schlechter, Port Nolloth, to Pastor Meyer, Steinkopf, who passed it on to the University of Stellenbosch. That W. Triebner collected it seems to be a mistake. From the above it is quite clear that *L. aurantiaca* is identical with *L. turbiniformis*."

CARALLUMA JOANNIS Maire

By Dr. R. MAIRE and J. GATTEFOSSE

This *Caralluma* was discovered by J. Gattefosse in the Sous (south west Morocco) in 1933 at Taberbourt, in the region of Tachguelt, at a spot which is an isolated habitat of *Euphorbia resinifera*, a cactus like plant rare in the Atlas Mountains.

Three years later, Mr. Pitault, Director of the Ecole d'Apprentissage de Taroudant, collected some cuttings of the same species at Aoulouz, on the steep rocky cliffs dominating the Sous River, near to the modern bridge.

Cultivated at Ain-Sebaa, in our own experimental garden, the cuttings from Taberbourt and from Aoulouz flowered for the first time in October, 1939, then more abundantly in October, 1940, which permitted Dr. Rene Maire to describe and name the species in "Contributions" No. 3183, part 29.

Cultivated in pots at Algiers, in the open air, the plant developed vigorously and satisfactorily survived the winters, but flowered rarely, and then only parcimoniously, in September to October.

The site at Taberbourt has not been found again and that at Aoulouz has, in large part, been destroyed by the construction work on the bridge over the River. In April, 1940, we could only find three plants, but we could not collect them as, to do so, we would have to be suspended in mid-air on the inaccessible cliffs.

On these cliffs, the species has pendent stems exceeding three feet in length and generally mixed with *Kleinia anteuophorbium* which is also pendent in these conditions. The xerophitic flora of the cliffs includes some shrubs of *Argania spinosa* and *Acacia gummifera*; *Warionia saharae* grows in large clusters; also *Opuntia ficus-indica*, *Forskahlea tenacissima*, *Convolvulus Trabutianus*, *Antirrhinum ramosissima*, *Launaea arborescens*, *Aristolochia baetica* and *Caralluma hesperidum* (not very abundant); annuals are rare—*Rumez papilio* and *Scrophularia arguta*.

C. Joannis Maire has been imported into France by Mr. J. G. Mitton of Lamorlaye (Oise) who undertook its culture.

The following description of the new *Caralluma* is dedicated to Mr. Jean Gattefosse :-

Perennial; branched, green, succulent stems, smooth, four angled, 6 to 10 cm by 1.3 to 1.5 cm, pendent on escarpments and attaining a length of three feet, a little concave on the faces, angles obtuse, sinuate, provided with a small tooth on the summit of the lobes which bear, in the young parts, a very small, oval, cuspidate leaf.

Umbels sessile, two to ten flowers inserted laterally on the faces of the body, below and not far from the apex. Flower peduncles smooth, short, reddish. Calyx red or green washed with purple, fleshy; sepals free nearly to the base, linear-lanceolate, acute, smooth, 4 to 5 mm by 1.2 to 1.5 mm.

Corolla rotate when open, 15 to 25 mm in diameter; corolla tube short, campanulate, about 5 mm in height, olive yellow spotted and rayed transversally in purple; lobes of the corolla 6 to 7 mm in length, width 5 mm at base, acute, velvet papillae on inner faces, rich purple internally, lighter externally and bearing on the interior faces some fairly large tubercles, darker, loosely ciliate on the margins towards the summit, elsewhere smooth as the tube; marginal hairs a lively rose, spindle shaped, 1.8 mm long, jointed at the base and easily caducous.

Corona externally cup-shaped, purple black, shorter than the tube, about 3 mm in height, con crescent lobes except at their summits which are free and corniform, so that the corona externally bears ten concolores corners, 0.8 mm by 0.2 mm, straight or lightly curved, nearly acute. Divisions of the internal corona con crescent on the back with the external corona linear above from a triangular base, truncated at the summit, purple black, adpressed on the anthers and also as long as the latter.

Anthers yellowish, rounded at summit. Stigma pentagonal, white.

Flower has a fecal odour when open. Flowers at the first rains of the autumn (September to October), sometimes in April.

In the illustration pages will be found a photograph of *Conophytum frutescens* sent to us by Captain H. J. Dunne Cooke and which was taken by his son. Not only does it illustrate the article on *Conophytums* by Mr. Herre, but it illustrates an abnormal growth by this plant.

MAMMILLARIA DELIUSIANA Shurly, spec nova

Planta simplex, satis raro sparse fasciculata radices paucae, angustae circiter 10 cm longae, laterale fibrosae. Corpus breviter cylindrico-semiglobosus; tubercula cylindrica, latice aquoso, spiris 13 et 21; axillae setis aliquantulum lanosae; areolae magnae; spinae radiales 24, albi, centrales 4 imae nonnunquam uncinatae; flores purpurei, in parte convexa apicis plantae evoluti; fructus virides, ob-ampullacei, basi plantae repertae; semina rubro-brunnea.

Usually simple, very occasionally clusters sparingly; short cylindrical or semi-globose; apex barely sunken; type plant 70 mm wide, 80 mm high, including spines (natural habitat up to 20 cm high), underground 30 mm in addition. Tubercles green, cylindrical, spirals 13 and 21, watery sap, 10 mm high, 4 mm wide at base. Axils only slightly white woolly, with 6-9 mm white bristles. Areoles flattish oval, 3 mm white, in age naked. Radials 24, 3 at top, 3 at bottom, 5-6 mm long, rest bunched laterally, 8-9 mm long, chalk white, rigid, straight, radiate horizontally. Centrals 4, crosswise, lowermost sometimes hooked, on top of plant usually straight, lower half of side never hooked; 15 mm. long, lowermost 25 mm long; at apex light to dark brown with small black tip, below apex lower half white, upper half variously coloured pinkish or pale, sometimes a darker, brown, dusted white, not pubescent; nearly porrect, in age centrals white, half size. Flowers June to August, medium green tube, campanulate, 20 mm long, 18 mm wide, buds pointed, at bulge of plant. Sepals 10, lanceolate, entire, red with brown tinge in centre, very narrow white margin. Petals 15, oblong, entire, dorsally pinky white margins, red centres, frontally red purple. Filaments satiny white. Anthers white, pollen small, oval, slightly fluffy, pale cream. Style 15 mm long, white. Stigma 5, very small, linear, barely spreading, pale green, pubescence same: 39 buds in rows of three in axils of left spirals. Fruits 10 mm long, 5 mm wide, 3 mm at base, bulbous apex with narrow base, like an upturned flask, often at base of plant, at first green, later tinged pink. Seeds reddish brown, plump oval terminating in a blunt point, one side of base rather straight, very shallow pits, irregularly placed, tending to vertical lines from base, very short, but wide hilum at immediate side of base.

Discovered by Fritz Schwarz in the Iguala Mountains, State of Guerrero, Mexico, in shade of trees between rocks in leaf mould and named, at his request, in honour of the late Fritz Delius, his close friend and collaborator in researches and studies of cacti. Mr. Delius was the manager of the Banco Financiera y Fiduciaria del Centro, S.A., Mexico and was a lover of nature as well as a cactus collector.

I have had this species for some time, but I deferred describing it being unsure of its relationship with *M. guerreronis* and *M. zapilotensis*. It was sent as similar to *M. spinosissima*, but there is only superficial resemblance. Real similarities with *M. guerreronis* and *M. zapilotensis*, including habitats, caused me to pause before rushing into print, but lengthy study convinces me that *M. Deliusiana* merits specific rank because of the inverted flask-shaped, green fruits as against the normal linear, red fruits of the other species. A further very important point is that the flowers are sited at the bulge and towards the top of the plant, whereas in *M. zapilotensis* the flowers are sited one third down the side of the plant, *M. guerreronis* has not flowered with me and I have seen no floral photograph. *M. Deliusiana* rarely clusters and grows up to 20 cm long, but the other species freely cluster and grow up to 60 cm long; *M. guerreronis* is very long, narrow cylindrical, *M. Deliusiana* is subglobose to short cylindrical; areoles in *M. zapilotensis* hardly exist, *M. guerreronis* 2 mm wide, *M. Deliusiana* 3 mm wide, more bulky and very noticeable; *M. guerreronis* hooked centrals are sited from half way up the side to the base infrequently; *M. zapilotensis* hooked in all parts; *M. Deliusiana* at bulge and just below infrequently; *M. guerreronis* white with slight pale red tip; *M. zapilotensis* red brown throughout with black hook; *M. Deliusiana* white, very slightly pink tinged, black hook *M. guerreronis* yellow brown bulbous bases, *M. zapilotensis* golden brown, *M. Deliusiana* slightly swollen, hardly bulbous, same colour as spines.

In photograph of the type plant will be seen half dried fruits still showing much of the bulbous apex, also the site of the flower in the dried remains on the left. It is unusual, but under cultivation, this plant produces normal, linear fruits half way down the side of the plant in addition to the inverted flask-shaped fruits at the base. The other photograph shows three plants, *M. guerreronis*, *M. Deliusiana* and *M. zapilotensis* for comparative purposes, with the last named in flower.

Type plant deposited with the Herbarium, Royal Botanic Gardens, Kew.

STROMBOCACTUS SCHWARZII Shurly, spec nova

Planta simplex; radix maxime evoluta. Corpus depresso semi-globosus, turbinatus; tubercula subapplanata, rhomboidea, quadrangula, latice aquoso, axillae nuda; spiri 5 et 8 spinae sive 1 sive 2 antica brevis, postica elongata, vertice plantae tantum evolutae; areolae ovatae, setis sericeis copioso-indutae, vertice plantae tantum evolutae. Flores albi, prope medium plantae verticem ex areolis proxime ante spinas exorientes.

Plants simple, small, 35 mm wide, 20 mm high including spines, with a further 30 mm underground, brown in colour; depressed semi-globose; turbinate. Tubercles diamond shaped, broad and stumpy, four angled, spirals 5 and 8, chartaceous in age, pale green with minute dots of short white hairs, like down, watery sap; bearing 1-2 yellowish brown or whitish, horn coloured spines; when 2, one 4-5 mm long in forward part of areole, second in rear of areole up to 20 mm long; spines bunched at growing point in the centre of the top of the plant, decreasing in size and in age completely disappear. Axils naked. Areoles oval, bushy with long white, silky hairs, at top of plant round growing point, quickly disappear. Roots tap formation, nearly shaped like a drawn molar tooth, with mass of fibrous roots. Flowers July to September, usually in pairs, sometimes one appears before the other. Sited near the centre of the top of the plant from areoles and immediately in front of the spines, 30 mm long, 40 mm wide, short tubed, rotate-campanulate; enclosed ovary 4 mm long, scaled, greenish with red brownish specks; sepals 6, in three series, (1) two 8 mm long, 2 mm wide, lanceolate, margins entire, reddish brown with narrow greenish white margins, (2) two 14 mm long, 5 mm wide as (1), but margins wider and whiter, pale green halo round red brown and "winged" by jutting piece on each side with occasional tooth on margin, (3) two as (2), 20 mm long, 8 mm wide, with margins much wider and green not so evident. Petals in three series, (1) three, 27 mm long, 7 mm wide, linear tapering to round apex, margins entire, white with red midrib with faint green halo, (2) five as (1), but midrib thin and green halo fainter and apex somewhat attenuate, (3) eight 27 mm long, 7 mm wide, as (2), but entirely white with occasional faint trace of a very thin midrib. Filaments numerous, thin, pale greenish white lower half, faint purple upper half. Anthers faint purple, pollen orange, oval to linear, slightly fluffy. Style 20 mm long, faint purple. Stigma 5-6, long narrow linear, spreading, white, pubescence fluffy and white, with very thin, faint purple line dorsally. Fruit and seed unknown.

Discovered by Fritz Schwarz and named, at his request, in his honour. The species grows in the eastern part of the state of San Luis Potosi, Mexico in heavy black earth among small green plants or grass and mostly under shrubs. In their natural habitat, they grow up to 4 cm in diameter. The plants need to be kept fairly dry.

Type plant deposited with the Herbarium, Royal Botanic Gardens, Kew.

By the time you read this number of the Journal, the Autumn Show of the Society will have taken place. The material for the Journal has to be in the hands of the printers one month before it is actually issued, so that no comment is possible now, but a full report will be given in the January 1949 number.

In the July Journal we asked if the reprint of the old article on *Cephalocereus senilis* was of interest. In no case has any comment been received and the Editor notes the lack of interest.

Some members have duplicate parts of our pre-war Journal which can be very helpful in completing volumes for new members and enquirers overseas. If you have any, would you be good enough to send them to the Editor? They will be put to good use.

REPORTS OF MEETINGS

July 6th, 1948 ; Novices' Evening

Mr. Holmes ; Mr. Boarder expresses disappointment with seedlings at the Exhibition and advocates watering through winter months which is not always possible, hence the disappointment.

Miss Poore ; While at school an old lady gave her some plants which were lost by over-watering. Later started again with Mr. Edwards' help. No experience of bought seed and had difficulty in rooting imported plants.

Mr. Naylor ; Grown cacti for 35 years, but only in last 15 had begun to learn about them. Had kept them in boxes covered by sacking in winter. Fifteen years ago bought a small collection and many are still alive. Has oil heater and occasional smoking. Flowering desert plant in rooms is helped by adding a little more humus and sand.

Mr. Bagley ; His wife was given an *Echinopsis* which bloomed and roused his interest. He installed shelves in a window and now considers he must have a greenhouse. Cacti must have ventilation, rain or shine. His plants were blasted and were, then, covered with roofing felt and some glass and became attenuated and have never recovered. Succulents require different conditions otherwise they flower and then disappear.

Mr. Milton ; Had cacti before the war. Three years ago commenced to grow from seed. South African succulents, planted in ordinary garden soil and sand, failed. Mr. Boarder's method gave fair results. Then tried an American material, called Vermiculite, a form of mica. He showed two plants, one in John Innes compost and one in his own with Vermiculite added; the latter was three times larger. His mixture is eight parts John Innes potting compost, one part each Vermiculite and Cornish sand.

Mr. French ; Paid Mr. Denton many visits and always came away with a few bits and pieces.

Mrs. Burton ; When her collection was spoilt by smoke from heater used a vacuum cleaner and had also used bellows.

Mr. Boarder ; John Innes compost is no secret formula, but is cheaper than getting the ingredients yourself. If too much loam, add crushed bricks and bones. Seedlings can be grown without heat, but a greenhouse is necessary. *Stapelias* like being broken up frequently and flower better. Burnt clay is good for rooting imported plants, but if kept in it seems to fall a victim to root bug.

August 10th, 1948 ; Experts' Evening

Mr Boarder ; as a lad of 11 had an *Echinopsis* flower three times and was so interested he wished to get more, so took a job on Saturday for 1/3 ; gave his mother 1/- and, with the rest, bought a new plant, so at 14 had quite a mixed lot, but, after five years in the services, lost them. He started again with a sample dozen from Hollis, but decided to start a collection from seed and is still keen on this method. He showed well grown seedlings sown in 1946 and 1947. They must be potted on. Unshaded greenhouse needs plenty of air to avoid scorching. An all round of 50-60 degrees in summer, 36-38 degrees in winter. Watering the biggest problem, when and how much.

Mr. Shurly ; His interest was aroused by small cacti on a miniature greenhouse exhibited by Mr. Emms at the People's Palace and obtained 100 plants for 25/- from Hollis. It is symptomatic of all beginners to believe they are experts and feel the urge to write of which we have had experience recently. Founded the Cactus and Succulent Society of Great Britain, but 30 years of study had convinced him he was no expert. Why was there dislike of scientific articles? If you understand your plants you know why substances, such as Vermiculite, benefits them. Knowledge of structure and habits helps to grow finer specimens. Probably dislike is founded on lack of knowledge.

Mr. Collings ; As a lad owned a plant which was green all over with a lot of white wool and little sticks poking out. He thought it funny and acquired some more. He read articles in Popular Gardening with which he disagreed and, writing to know who was the author, first met Mr. Shurly. Lime had not proved successful with long spined plants. Was very interested in Mr. Judd's method of grafting *Cereus flagelliformis* and *sylvestris* on bits of *Pereskia*. Grafting does promote growth of some plants, but do it artistically.

Mr. Pullen ; Met Mr. Endean and Mr. Emms at a R.H.S. Show and purchased a dozen cacti and succulents; a puppy chewed up some and so he found they could be propagated and so gradually built up his collection. A plant pushed in a corner often does better than "expert" handling.

September 7th, 1948 ; Covent Garden Succulent Corner

Once again a very successful evening with about 50 present most of whom brought plants for exchange. As before, the greatest success was the social contact and the talking over of the various experiences and difficulties.



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6 p.m.

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SOCIETY NEWS

November 2nd ; K. W. Harle ; Growing cacti and succulents on a commercial basis.

November 30th ; W. Denton ; Euphorbias.

December ; No meeting (see Nov. 30th).

January ; No meeting.

A number of members have been showing their plants at local Shows, the organisers of which welcome this kind of support. Such exhibits help to popularise cacti and succulents and can advertise the Society. To members intending to show their plants in this way, the secretary would be pleased to send a supply of leaflets which can be given away at the exhibition. Increased membership means further advantages to the members. Our member, Mr. E. J. Holmes, won the Kew Cup for Cacti and Succulents at the Ilford Horticultural Show held September 3rd to 6th.

We remind you of 1949. The majority of members are prompt to renew their subscriptions, but those not so prompt are reminded that to renew quickly is to give twice, because we can budget for the coming year and prepare even greater advantages for members. As soon as possible after 1st January, 1949, please send your subscription to the Hon. Treasurer.

The note in the July Journal that copies of Professor Nel's book "*Lithops*" were in the possession of the Editor resulted in all copies being sold. A discount was given by the publishers and this has been applied to reduce the cost of the Library copy.

We have frequently heard the Librarian complain that some members retain books for an inordinate period and even that some, who have not renewed their membership, have not returned books, even that some continue to apply for books! Will these delinquents please take the hint and remember that other members are waiting, for the Librarian has quite a long waiting list for a number of popular books, and those waiting lists can only be reduced by the prompt return of books.

In this number is a report of the North Kent Branch which is doing good work. This is the first result of our appeal for Branches. Will members in the Windsor area, interested in the formation of a Branch please write to Mrs. M. Stillwell, 18 St. Andrew's Crescent, Windsor. Branches assist many who are unable, because of the distance, to attend meetings at headquarters.

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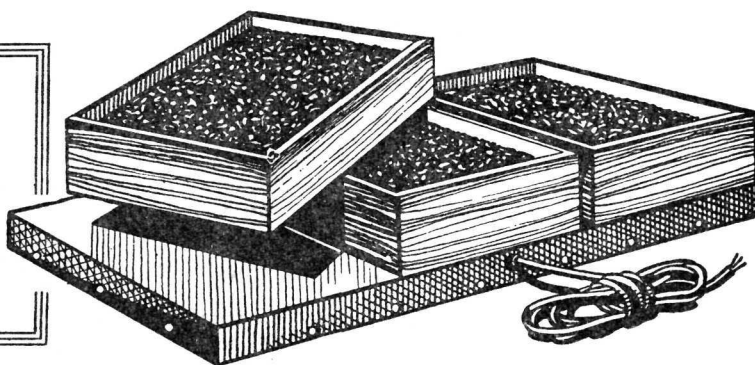
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