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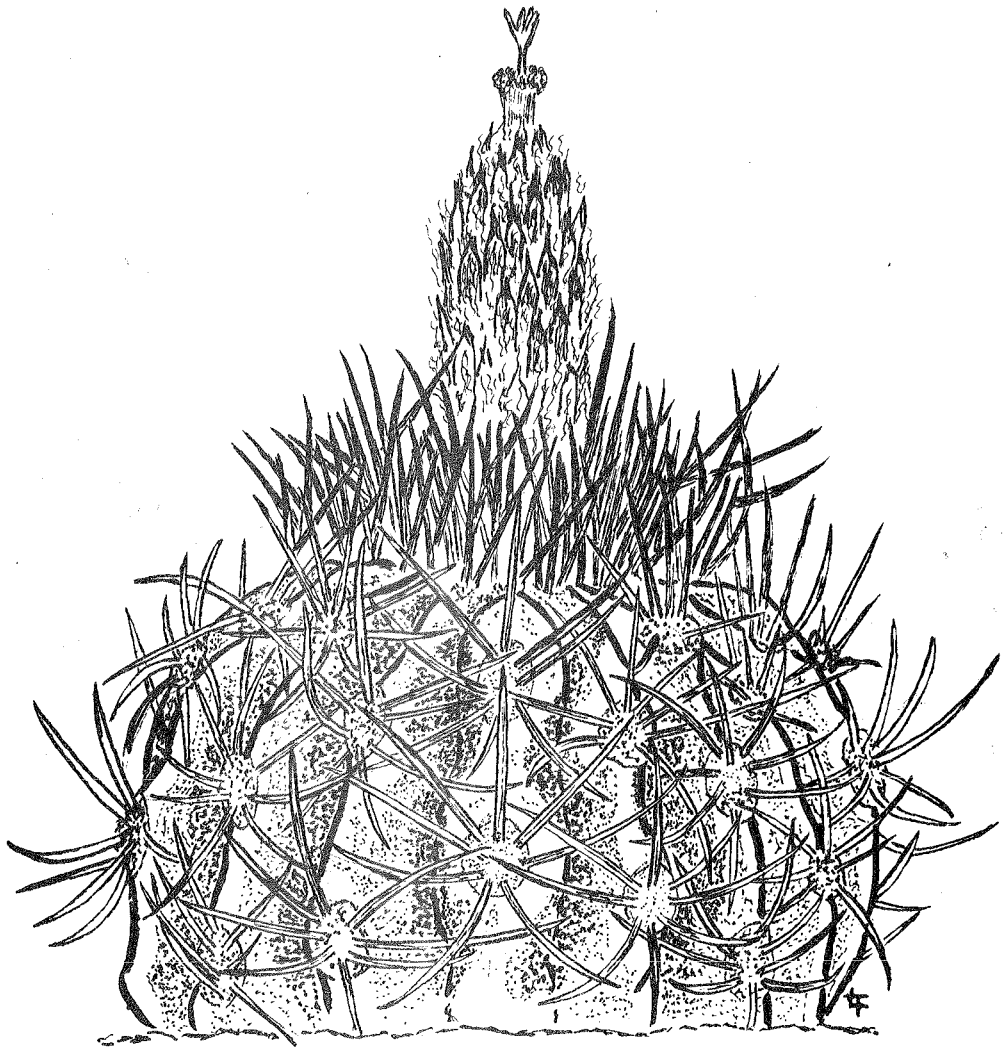


DENMOZA RHODACANTHA

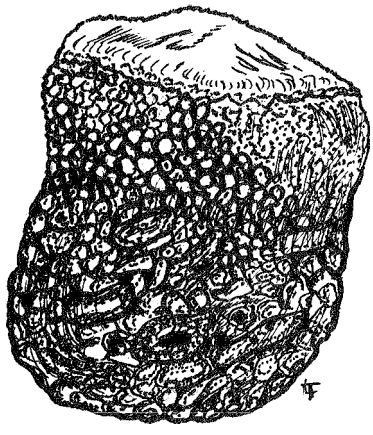
ACTUAL SIZE

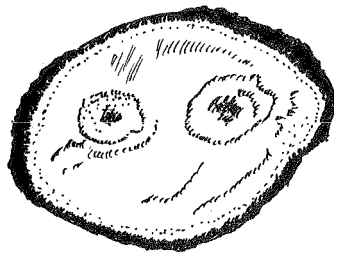
COLLECTION - R.DAVISON

TOM LAVENDER

DENMOZA ERYTHROCEPHALA

Photograph & Collection - Mrs L.E. McIntosh

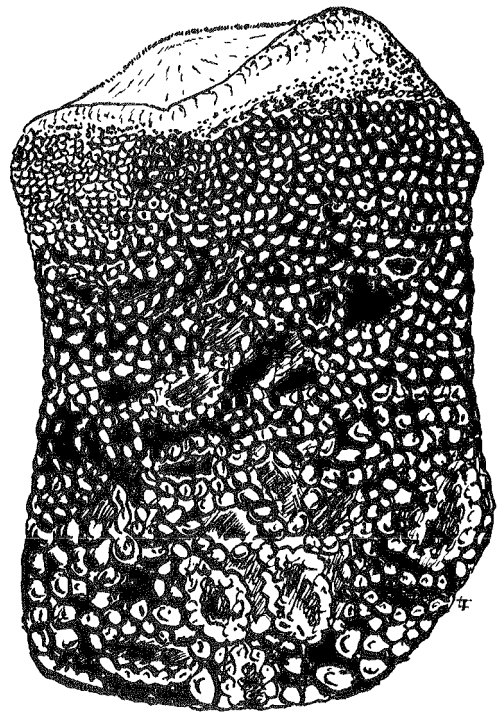


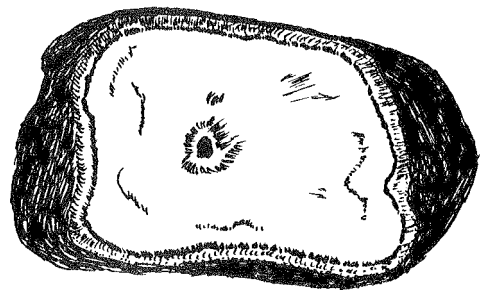


Denmoza

erythrocephala

SEED





Denmoza rhodocantha

SEED

DENMOZA ERYTHROCEPHALA FLOWERS from Mrs L.E.McIntosh

This plant was grown from seed which I purchased from Winter in 1957 and it flowered for the first time at the age of ten years whilst still globular. The plant has elongated over the last five years and is now 8" tall and 5" across (not including the spines).

It is an attractive plant with a brownish green body, many large pink woolly areoles, heavy spines which are deep red when new, passing to rust red and finally to grey at the bottom of the plant. When globular it had several silky white hairlike bristles about 1" long from all the areoles but it has now lost these from the old growth and only retains them in the top third of the plant.

The buds appear in early summer as small balls of silky white hairs from the top of the areoles in last season's growth. They take approximately four weeks to grow to maturity and are then about 2" tall, tightly closed at the top and slightly zygomorphic, bright purple in colour with very fleshy shiny scales about 5/8" long, symmetrically arranged and covering the tube; tufts of white silky hairs grow out from under the scales. The top of the flower then opens to reveal a row of petals, slightly longer than the scales, lighter in colour with an orange overtone and much finer in texture, from which protrudes a large pinky cream stigma with 8 lobes surrounded by a tightly packed bunch of stamens of the same colour as the petals, the colour paling to almost white at the base of the filaments and shading out to deep purple anthers topped with purple pollen. The filaments are inserted over almost the whole height of the wall of the tube.

The picture opposite shows the flower fully open and they remain like this for about five days and then drop off if not pollinated. This year my plant had 8 flowers; all these buds appeared together but only two come to maturity at one time, the others growing more slowly. I do not know if this is typical but over the five years that this plant has flowered I have never had more than two flowers open at the one time and often only one. As the plant is not self-fertile I cannot see what nature is trying to accomplish by this; perhaps the plant cannot feed more than this at one time.

I have cross pollinated two flowers with a brush, one with Submatucana intertexta and the other with a Borzicactus. Both flowers on the Denmoza set fruit but very strangely the Denmoza did not fertilize the Submatucana or the Borzicactus. The berries are globular, dark green in colour with many tufts of silky hairs growing from minute rosy pink scales which give them a very woolly appearance. At eight weeks from brushing, the berry fertilised with Borzicactus was the size of a small walnut, while that brushed with Submatucana was only half that size. Over the next few days both berries turned yellowish green and finally, at nine weeks from the date of fertilisation, both split across the top exposing a sticky white pulp with many large black seeds. The whole dried flower remains were retained even after splitting.

Comments ... from H. Middleditch

"The two fruits were received in the U.K. seven days after removal from the plant in New Zealand. The fruit had set quite hard with the large black seeds embedded in a white mass which must have been the dried-up seed strings. The split in the fruit ran from near the base up to one side of the dried flower remains and then down the other side nearly to the base again. The separation, counting and examination of the seeds was undertaken with Mr & Mrs Lavender; quite a number of small black particles which were examined prior to being discarded proved - under a small hand microscope - to be under-developed seeds. When all the dried up internals of the fruit had been removed from the walls, the seeds had to be separated from the dried-up seed strings and general chaff and then counted. There proved to be 212 seeds in the smaller fruit and 644 seeds in the larger fruit. By the greatest of good fortune a packet of seeds of Denmoza rhodocantha (collected) had arrived from South America almost by the same post as the fruits from New Zealand, so both were examined under a X30 microscope.

"After spending some time bending over the fruits and the seeds, there was a pause to straighten the back and ease complaining muscles at which the paper carrying the seeds under scrutiny - although untouched - wafted gently off its support and down to the floor. After a suitable pause to contemplate this disaster there followed a most learned discussion on the best course then to be adopted - ranging from vacuuming the carpet and sowing the collected uptake, to just leaving everything alone with the electric radiator left on and watering the carpet. However, as a result of a few more hard-worked back muscles all three samples will appear in the next seed list."

... from T. Lavender.

"The seeds shown in the accompanying illustration were examined under a x 30 microscope, the seed of D. erythrocephala coming from the plant shown in the photograph above the seed - from Mrs L. McIntosh in New Zealand, while the seed of D. rhodocantha came from R.Keisling in Buenos Aires, Argentina.

"The seeds are sketched at about 30 x magnification. The seeds of D.rhodocantha looked very large even in the transparent packet; each seed is almost 3 mm high, about 2.0 mm wide and 1.2 mm thick. D.erythrocephala was immediately recognisable as a smaller seed, being about 1.8 mm high, 1.4 mm broad and 1.2 mm thick.

"Both species appear to have a testa with numerous shiny high spots reflecting incident light but the surface is probably shiny overall. At the hilum end the testa cells are small in size and rounded, giving a more or less uniform verrucose surface. Close to the hilum the testa cells become even smaller and more densely packed. Towards the top (or is it the bottom?) of the seed, the testa cells become arranged in whorls surrounding a fairly deep pit or crater which appears to have a rough surface - but one in which individual cells cannot be distinguished. The largest craters occur around the crown of the seed. These surface features appear on both species of seed.

"The hilum is a fawn colour with numerous highlights reflected from the finely roughened surface, which has the appearance of a mass of close packed fine sand crystals. On the seed of D.erythrocephala the hilum has a fairly uniform surface of this nature, whereas in D.rhodocantha, irregular dark patches also appear on the hilum."

... further from H. Middleditch

"The seed of D.erythrocephala sketched by Tom Lavender compares favourably with the illustration of a seed of this species which appears as Fig. 445 in Buxbaum's "Morphology of Cacti". The large pits or craters on the testa would not seem to occur on other species of cactus seed to any comparable degree.

"The seed of D.rhodocantha appears to be larger - in fact, much larger - than any other seed sketched or discussed in the Chileans to date.

"Incidentally, which is the top of the seed and which the bottom?"

DENMOZA BR. & R. by B.K.Boom and A.M.Wouters.

(Translated by W.W.Atkinson from Succulenta October 1963).

Denmoza rhodocantha (Salm) Br. & R. is a well known cactus of which splendid specimens can be seen in older collections. They grow very regularly and form an egg-shaped body, which presumably only becomes somewhat longer as it grows older. The striking red-brown spines contrast beautifully with the dark green colour of the body. The plants hardly ever offset and can be regarded as solitary. They have 15-20 ribs with large areoles with 8-12 lightly curved, red-brown spines. The flowers appear at the top of the plant, though occasionally slightly lower; they are tubular in form, slightly zygomorphic, symmetrical and completely red in colour. The ovary is

fairly long and thickly covered with scales; petals short and straight; the stamens and pistil stick out of the flower.

It is not known who originally imported the plant, only that Salm included it in his catalogue in 1834 and that he got it from England.

There is a second species, Denmoza erythrocephala (Schum) Berger. Like D.rhodocantha it is a very slow grower. Grafted on a thick Trichocereus spachianus we (Wouters) succeeded in producing a flowering plant in 14 years, which gave one or more flowers almost continuously from the end of June to late Autumn. Ungrafted, it would not be possible to get this splendid plant to flowering size.

This species differs from the former in being more elongated, together with the fact that white brush-like hairs form on flowering areoles. In young plants it is difficult to distinguish the two species.

Whether the distinction between the two kinds should be maintained, we do not propose to judge. There are authors e.g. Berger and Britton and Rose, who claim that D.rhodocantha is only a juvenile form of D.erythrocephala and they amalgamate the two species as one. Others like Backeberg, clearly see two species. It is our opinion that only a field study can decide this point and as under cultivation the two are so clearly different, we maintain the two names for the time being.

The flowers indicate a close relationship with Cleistocactus and Seticereus. We (Wouters) managed to obtain viable seed from a cross between Denmoza erythrocephala and Seticereus icosagonus (S.aurivillus) - both plants produced normal fruits. The seedlings are at present 5-10 cm high and very variable in form and colour. There are also known to be hybrids between Cleistocactus straussii and Denmoza erythrocephala.

Comments on Denmoza

.... from H. Middleditch.

"This article recalls the first reference to a plant which now appears under the name Denmoza, as early as 1834. In subsequent years it was placed under Echinopsis, Echinocactus, Cleistocactus, Cereus and even Pilocereus. It finally received its present generic name from Britton and Rose in 1920, who grouped it with a great many other North and South American cacti under the sub-tribe Echinocactinae.

"Backeberg placed this genus in a much smaller group of genera, under his section Loxanthocerei, all of which have more or less zygomorphic flowers, some of which have the lowermost filaments joined together in a web or diaphragm which more or less closes off the nectar chamber, and some of which have a greater or lesser number of fine hairs - or vestigial filaments - immediately above the nectar chamber. The flowers on Denmoza would appear to be less zygomorphic than those on many other species in Loxanthocerei, but the mass of fine hairs located inside the flower tube above the nectar chamber and below the stamens is probably a better developed feature in this particular genus than in any other plant in the Loxanthocerei. In its tubular shape the flower is obviously fairly close to Cleistocactus and while the flowers on Cleistocactus are noted for barely opening beyond the form of a tube, in Denmoza the tips of the petals do not even open out to the same diameter as the rest of the tube. It must be a very difficult job for any insect to enter the flower tube to gather nectar.

"On our very first Cactus Tour to the Riviera in 1962 we came across one of these plants in flower at Delroue's on the French-Italian border. I suppose the plant would be round about ten inches in height, growing out of doors with a free root run. On our 1969 Tour we had the pleasure of a visit to the collection of W.Andrea who had a very fine plant of Denmoza growing with free root run in his centre bed; I suppose it would have been quite twenty inches in height and a good five inches broad at its widest and had a fine crop of flowers in the crown.

"This led me to the belief that a Denmoza had to be nearly as old as Methuselah and growing in southern Europe before it would flower. In consequence it was with some astonishment that I discovered a Denmoza rhodocantha some five inches high with two dark red flowers, at Affleck's nursery en route to Glasgow; as usual, when I express surprise at such a sight, I received the comment that it was not the first year that it had flowered. Not long after, came the news of the plant on our cover which had been grown from seed by a member of Grimsby Branch and acquired as a seedling by R. Davison in whose collection it flowered at about 8 years of age, and in each subsequent year, the last season yielding a total of seven flowers in all, in two crops.

"If there is no difference between D.rhodocantha and D.erythrocephala, as has been suggested, it is somewhat surprising that one sort should appear to flower when about half the age of the other. Or can it be that the plant will flower if it receives treatment which suits it?"

... from R.Ginns.

"I have a specimen of D.rhodocantha which is 8" in diameter and 10" high bought from Churchmans nursery about 1954 as a small ($2\frac{1}{2}$") import. It has not flowered for me yet or offsetted. D.erythrocephala had reached 4" from seed when it was partly cooked in a disaster to the cactus house in April 1970 - temperature 145°F with no ventilation. The west side of the plant was burnt from base to growing point but the latter was not damaged and the plant is now growing again for all it is worth. Another seedling from Uhlig's seed labelled 'sp. nov.' but probably D.erythrocephala is now a nice plant, 4" diam. and unmarked. All on their own roots.

"I note that Wouter's grafted plant took 14 years to flower. But last year I saw a reputed Denmoza in flower in a $3\frac{1}{2}$" pot! It certainly looked like my D.erythrocephala but I did not examine the flower closely. Could it be a Matucana or Arequipa, or possibly one of the Cleistocactus hybrids, of which I have a batch of 1 year old seedlings?"

... and further from H. Middleditch.

"March and April seem to me to be the months when collectors are most likely to get caught out by an unexpectedly fine bright day causing scorch troubles. My own Pachyphytum viridis always bronzes up nicely in March and then begins to show rather more green at the end of April and I think that this could be in response to a strong but low sun.

"In Backeberg's Die Cactaceae there is an illustration of a Denmoza x Cleistocactus hybrid but the examples shown seem to take the more elongated habit of Cleistocactus; hybrids of this type should not be too difficult to distinguish from true Denmoza."

... from C.Webb

"Having moved from sunny Hampshire to the frozen north the last thing that I expected to suffer from was trouble with scorching - but in March this year several plants were very badly marked as a result of two otherwise nice sunny days."

We have a slide of this plant in flower - a close-up of flower or fruit would be very welcome - A.W.C.

A BEAUTIFUL INTERESTING NEW DISCOVERY FROM ARGENTINA: GYMNOCALYCIUM HORRIDISPINUM sp.nov. by Gerhard Frank.

(Translated by E.W.Bentley from K.u.a.S 14.1: 1963)

In the autumn of 1961 I received from the Argentinian collector H.Fechser a plant consignment that consisted mainly of Gymnocalyciums. Two of the plants with a collectors designation L.Ros.Esp. immediately attracted my special attention. First, because with their dark green bodies and the fierce, erect, very stout spination they were strikingly handsome and then also above all because this growth form was so far unknown to me in the genus Gymnocalycium.

Finally I decided that the species must belong to the gibbosum group because at first sight there were here certain resemblances. I wrote at once to Herr Fechser and asked whether these plants came from South Argentina, from Chubut, or from Rio Negro and whether perhaps he had been able to observe particularly large long white flowers on them. The answer surprised me for it ran: discovery place in the Province of Cordoba, therefore north middle Argentina and to judge by the dried flower remains, no very large flowers. Now then if it really was a Gymnocalycium, it must be a new species for none of the species known and described up till now from this area fitted even approximately to the foregoing plant type. In the course of the next few weeks I saw at the homes of other collectors who likewise had acquired plants from Herr Fechser several of these "L.Ros.Esp." and was able to establish that it was a distinct, separate type.

The well-known Gymnocalycium specialist F.Bozsing of Salzburg had also received two of these remarkable plants and, like me, had been puzzled about it. We exchanged observations and came to the conclusion that it probably would turn out to be a Pyrrhocactus. We agreed that the first flowers would bring suitable clarification.

In the late spring of this year a surprise appeared in the form of deep red naked buds that emerged around the un-armoured crown, above the first (last? - E.W.B.) spine bearing areoles. So it was a Gymno. after all! And without doubt a new, until now unknown species. The smaller of my two plants brought forth two, the larger six, buds which all flowered together. Because of the protracted, cool, bad weather of May and June flower development was particularly prolonged and my patience was put to a hard test. The very thick, stout, red-tipped buds soon indicated that the flower would remain comparatively short tubed or at any rate would not reach the length of the gibbosum flower. Full opening, however, brought a most pleasant surprise, a wonderful two-coloured flower. The perianth leaves, at first pure white within, are edged violet-pink and have a similar coloured middlestripe; externally they are tinted violet-pink. They measure about 60 mm in diameter and 60 mm long, and stay open around a week. Attention should be drawn to the evident strong-flowering nature of this species since after the second and third day of flowering the violet pink flower colour deepened and spread and then only the throat remained pure white.

Gymnocalycium horridispinum is a very striking species which shows no resemblance or connection with other species. Seen botanically it is a truly valid species, which one has not been able to say with certainty about any Gymnocalycium species up to the present. A whole series of them varies unbelievably richly in nature and possesses graduated transition forms to other neighbouring species. This shows itself again and again very clearly in the large import consignments. I am convinced as a result that a large number of described Gymnocalycium species have been set up because, from importations from a type locality, extreme forms are sought out and described and thus the transition forms are ignored. On many occasions clear data from the collector are missing concerning the range of the specimens collected from a single type locality which would have given an approximate pointer to the degree of variation. Often, too, only a single locality form of a widely distributed species would be found and described without knowing the extent and degree of variation. Later finds from other localities which showed certain habitat differences would then be described as new species. The basic evil lay and lies perhaps in the fact that the majority of collectors keep discovery places secret and have just no interest in establishing the extent or reporting the degree of variation of even a restricted locality. Such facts are however indispensable to systematic and responsible evaluations and description of new plant material.

All imported plants of Gymnocalycium horridispinum that I saw showed complete uniformity of forms. Within the genus it would belong to the narrower group of "Microsemineae" and so be related to G.mostii, G.valnicekianum and G.oenanthemum. According to the collector the discovery place lies at 700-800 m altitude in hilly country which bears grass and low herbs. The plants are solitary, very scattered and infrequent, so that Herr Fechser could not collect very many.

Gymnocalycium Horridispinum Frank.

Simplex, breviter cylindraceum, ad 6-8 cm elongatum et fere pariter latum, obscure viride. Costae 10-13, gibberibus mentiformibus sub areolis prominulis; areolae magnae, ovales, 8-10 mm longae juveniles tomento flavo-griseo, postea brunneolo obtectae. Aculei marginales 10-12, crassiuscule subulati, recti, grisei, 20-25 mm longi, corpus versus curvati; aculei centrales 4, cruciatim ordinati, crassi, distantes, 30-40 mm longi.

Flores verticem inermem coroniformiter circumdantes; gemmae primum purpureae, postea virescentes et squamis rubro-terminatis carnosulis obtectae; flores 6 cm longae et latae, infundibuliformes; squamae in parte superiore receptaculi in phylla perigonii lanceolata albido-viridula, rubro-acuminata paulatim transeuntes; interiora alba, marginem versus violaceo-rosea, extus roseo-violacea, stria mediana obscuriore praedita; filamenta albida; antherae pallide luteae; stylus stigmatibus 10, albus; fructus ovoideus, obscure viridis, 15 x 20 mm, reliqui is floris exsiccatis adhaerentibus praeditus, in maturitate verticaliter disrumpens. Semina numerosa, sarcocarpio infossa; semen 0.5 - 1 mm, ovoideum, applanatum, hilo elongato inciso; testa atra, minute scrobiculato punctata.

Body solitary, short-cylindrical, 60-80 mm high and becoming about as wide, dark green, 10-13 ribs in fully grown plants, deep and sharply furrowed with prominent chins under the areoles.

Areoles large, oval, 8-10 mm long, in new growth yellow-grey felted, later becoming brownish.

Spines 10-12 radial, robust awl-shaped, straight, grey, often tipped dark brown, surface roughened, when wetted entirely reddish-brown, spreading somewhat curved towards the body, 20-25 mm long. Four central spines arranged in a cross, with thickened bases, very robust, strong, standing out from the body, of the same colour as the radials, 30-40 mm long.

Flowers in a circle round the un-armoured crown and emerging from just above the youngest spine-bearing areoles. Buds deep purple-red at first and clothed in red-tipped scales, thick, sharp tipped.

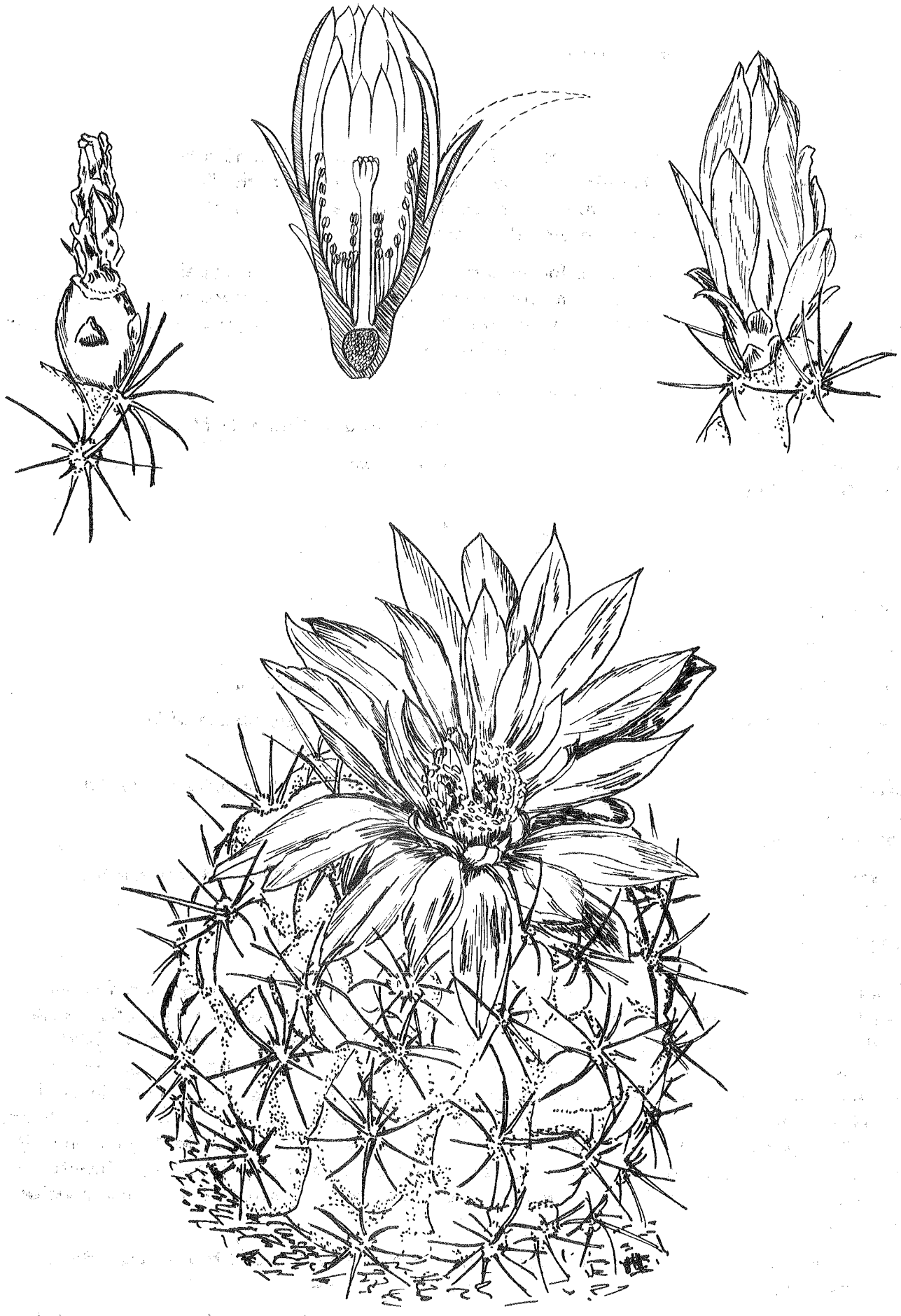
Pericarp and lower part of the receptacle green, covered with fleshy, red-tipped scales. These scales merge in the upper part of the flower tube into the whitish green, red-edged outermost perianth leaves. Flowers 60 mm long and 60 mm in diameter, broadly funnel-shaped, the inner perianth leaves after the flower opening pure white within with violet-pink edges and middle rib, violet-pink outside. From the second to the third day of flowering onwards the outer perianth leaves from the edge inwards become deeper violet-pink and only the throat remains pure white. Flowering lasts about a week.

Filaments white, anthers light yellow. The style ends with its 10 pointed stigma in the upper part of the stamen ring, both are white.

Fruit ovoid, dark green, 15 - 20 mm in size, with adhering flower remains. At ripening tinted light reddish and splitting vertically. Containing numerous seeds, embedded in white flesh.

Seeds small, 0.5 mm x 1 mm, oval, flattened, with obliquely cut-away hilum, black, testa punctured by fine pits.

Origin: Argentina, Province of Cordoba, south-west of Salsacate, on grassy hillocks at 700-800 m.



GYMNOCALYCIUM HORRIDISPINUM

Collection Mrs. J. Hobart

Comments on Gymnocalycium horridispinum

... from Mrs J. Hobart

"I read with interest the article by Gerhart Frank on Gymnocalycium horridispinum and was particularly interested in two points which he made - first the reference to the "unarmoured crown" and secondly the description of the flower, particularly the darkening of the petals on the second and third day of flowering, leaving the throat white.

"I have been able to have a look at four plants at various shows, all four being very much of the same age and of remarkable similarity - as Frank observes. However when I came to compare my own plant with one from the collection of H.Middleditch, there were some differences - the most noticeable being the "unarmoured crown" on the latter plant.

There follows a comparison between the two plants:

My own plant	Plant ex collection of H.Middleditch
Spines to the top - covering the crown like a wigwam.	Bare crown
Body 7.5 cm dia.	Body 7 cm dia.
On own root	Grafted
Body 6 cm high	Body 5.5 cm high
Ribs 9 at base, 13 at top	Ribs 10
Chins prominent	Chins not so prominent
Areoles 6 mm high x 5 mm wide with grey felt	Areoles 6 mm high x 5 mm wide with grey felt
Spines stout, rough orange reddish brown, dark brown when new; later grey with orange brown tips	Spines slightly less stout but of similar colour
Central spines $\pm$ 20 mm long 4 in number	Centrals similar length 4-5 in number
Radial spines 8-10	Radial spines 9-11

"I obtained some seed of this species from Lamb in 1966, two of which germinated for me and were subsequently potted up. I kept one seedling which first flowered when it was five years old. I first noticed the bud on April 17th and the flower finally opened from June 8th to 13th. The bud was red in colour with a quite pointed top when I first saw it; with three weeks growth it was showing much more green colour and after five weeks' growth it was mostly green with red just at the tips. Once the flower opened it proved to be a most unusual colour for a Gymno, being pale pink. The outer petals were pink with a deeper colour at the tips and also in the median stripe and had a greenish mid-stripe on the back. The stamens were cream and appeared to be inserted in more than one series. The style was robust and cream in colour, the stigma being readily visible and having numerous lobes.

"As this was the first flower on this plant I was not able to steel myself to take up a sharp knife and section it.

"This particular plant did not flower in the following summer, but the other seedling which had been in another collection for some time did flower, it then being six years old."

... from H. Middleditch

"My plant of G.horridispinum came from the collection of W.Withers; it was grafted on to a Trichocereus stock and it seemed to be prudent to leave it that way as long as it grew satisfactorily. The plant produced four buds in mid-April, very red in colour; possibly due to being left unwatered for a week whilst we were away, two of the buds dried up. The other buds grew into a brandy glass shape with a short, stout stalk, the tall sepals tapering towards an almost pointed top. The bud on my G.monvillei or multiflorum hybrid is of a similar shape and I have seen similar large buds with a tall tapering top and almost pointed crown on other Gymnos: I would not be surprised if they all turned out to have large flowers".

... from P.G.Waterman

"My plant of G.horridispinum came from Blackburn's nursery. It produced four buds this year, two of which opened towards the end of April and the other two about ten days later. The first two flowers each set seed without any external assistance from me, the fruit being a very similar colour to the body of the plant. The flowers on this plant are fairly large and I notice that they seem to stay open rather later in the evening than most other species of Gymnocalycium".

... from R. Ginns

"My plant of this species came to me from Mr.Martin, a Kentish nurseryman now retired, as a small seedlings in 1967. It is therefore six years' old and is now in bud for the first time.

"Body diameter (excluding spines) 6 cms; height 6 cms; Ribs 10; Central spines 3-4; radial spines 7, centrals straight up to 2 cms long; radials slightly curved, some nearly as long.

"Regarding the "unarmoured" centre, the topmost ring of spines has a diameter of 2 cms but incipient tubercles inside this ring show rudimentary spines. The centres of numerous other species of Gymnocalycium are quite as "unarmoured". In this connection I would point out that faulty cultivation may lead to absence of spines near the growing point. I have a large Ferocactus, badly scorched in 1970, and all new growth since then has been spineless; a Neoporteria nidus likewise has a bald centre. Adverse climatic conditions may have caused this defect on collected plants.

"Flower buds are much more conical than those on other Gymnos from which it easily distinguished.

"The plant is ungrafted, growing in a mixture of leafmould and sand, approximately neutral, but the leafmould is from trees growing on a strongly calcareous subsoil. No fertilisers used. All spines strong and heavy".

... from J. Arnold

"In regard to plants having bald centres, all the Neoporteria, Neochilenia and most Matucanas and Submatucanas which I have purchased have been bald in the centre on arrival. When these plants began to grow (after being potted) the bare areoles always produce spines and never leave a bald patch which would remain as an ugly band on the plant body. If it is any help in determining a cause, then the following may be of interest. A plant of Echinocereus ?pulchellus which was growing in shade last year produced no spines on any of its areoles. Being a two-headed plant I then artificially shaded one head, while leaving the other in the sun. Sure enough, the head in the sun produced spines at all its previously bald areoles (even the oldest) while the shaded head remained bald. When this bald head was moved into the open, even the light of a British autumn and winter has made the bald head become spiny. It seems to bea very curious phenomena which is quite unconnected with lush or bloated growth!"

... from G.J. Swales

"My plant of G.horridispinum was obtained from Mrs J.Hobart - it is six years old from seed and a fairly quick growing plant for it is now not far short of 4" across the body. It is flowering this year for the first time.

"Four flowers opened at one time while a fifth opened about five days later before the others had faded, giving a nice illustration of how much a flower can increase in size during its relatively short existence. Flower duration would appear to be about a week but not too much reliance should be placed upon this as the weather during that week was not particularly warm and the sun only intermittent. The flowers were quite sweetly scented on the first day of opening but on subsequent days the scent almost disappeared.

"The buds first appeared early in April; for several weeks afterwards we had cool weather with few bright sunny days so that the buds grew fairly slowly. As the plant was growing quite well at this time the buds moved out some distance from the growing point and when ready to open were situated on the shoulder of the plant. In the first instance, the buds opened up at about 4.30 p.m. and closed again quite quickly but on succeeding days they tended to open at about 1.30 p.m. and close again at 5.30 p.m. However, the weather was not ideal and these times may have to be modified in the light of further observations. Compared with other members of the genus it would seem to be a relatively late opener.

"The ovary is very short, measuring only 9 mm in height and merging almost imperceptibly into the flower tube. The ovary and flower tube are a bright yellow green contrasting with the dark glossy green of the plant body. The lowest scales are thin and membraneous 3 mm in length by 4 mm wide, with a green centre, very pale green almost white edges, and a pink tip. They are broadly inverted heart-shaped - almost triangular. The scales of the upper ovary and lower flower tube are 6 mm in height and 6 mm wide, spade shaped, with similar colouring to the lowest scales.

"The outermost perianth segments are 17 mm in height and 8 mm wide. The outer surface has a yellow-green central region, a brownish area towards the tip, particularly in the mid-line, and almost white edges. On the inner surfaces of these, the green colour is almost absent except right at the base, the general colour being pale pinkish brown with a darker tip. They are more or less strap-shaped and have an obtuse rounded end. The perianth segments of the middle region measure 3.2 cm in height and 9 mm in width, and the outer surface is pink with greenish-brown shaded mid-stripe and darker tip; on the inner surface they are pink with a deeper pink coloured centre region and even darker tip. The inner perianth segments are a beautiful lilac-pink with darker, not very well defined, mid-stripe. The extreme base of the petal is almost white. The colouring appears to be the same on both sides in this instance. The shape of the longest petal is linear to obovate, the tip ending in a minute point, and the overall length is 4 cm with a width of 1 cm at the widest point. The innermost perianth segments are somewhat shorter and linear-lanceolate in shape.

"When fully open, the flower is trumpet shaped and up to 8 cm in diameter, the longest perianth segments folding back into an approximately horizontal position. The stamens are arranged in an orderly manner close to the perianth and thus leaving a wide throat with the style completely exposed for about one third of its length. The primary stamens are tightly bunched around the lower two-thirds of the structure.

"The stamens are numerous and bear creamy-yellow anthers. The filaments are white. The primary stamens are inserted in the flower tube at a point about one quarter of the total distance up from the base, and are very close together, the innermost, longest ones measuring 1.7 cm in length, the outermost shortest ones about 8 mm only. There is no clear division between primary and secondary stamens in terms of the point of insertion but the latter lie back close against the flower tube with only the anthers outstanding to any extent. The whole of the remaining three-quarters of the flower tube bears secondary stamens more or less uniformly scattered. Those highest on the flower tube are about 1 cm long, the remainder about the same length, or

very slightly shorter.

"The style is a relatively robust structure, 2.5 cm long (excluding the stigma lobes) and 2 mm in diameter, white in colour. The stigmatic lobes are cream coloured, eleven in number, and each 5 mm long. These lobes were bunched tightly together when the flower first opened and loosened slightly during the rest of the time the flower remained open. However, I did not observe the stigma wide open as occurs in other species of Gymnocalycium.

"The immature ovary gives the impression that a small globular fruit will result, but at the time of writing, pollination has only just been attempted and a detailed description of the fruit must wait until a later date.

"In regard to the comments from Ron Ginns about the 'unarmoured crown' - some species of Gymnocalycium exhibit a new spine growth almost as soon as the tubercle can be identified, but others do not seem to produce spines until the areole has moved outwards some way from the centre. I have the impression that various authors - especially older authors - often refer to the centre of a plant being unarmoured as a specific feature. I find that this feature does occur on actively growing plants where the spines are formed rather more slowly than the actual plant centre is growing, in the manner described by various authors. It would hardly seem that all these observations could have been made on badly cultivated plants".

... further from H. Middleditch.

"The fruit observed on the plant in the collection of P.G.Waterman had a rounded base and straight sides tapering to a broad top which was capped by the flower remains - unlike the barrel shaped fruit shown on the accompanying illustration, which is similar to those seen on this species in the collection of H.Till on our 1969 Cactus Tour and in the collection of Fleischer at Brno on our 1971 Tour.

"Not only is the habit of this species with its lengthy and robust spines quite different from that of any other Gymnocalycium, the seed is also quite different, being unlike that of any other Gymno species. It is similar in outline shape to Lobivia seed.

"From his later writings one might perhaps fairly presume that Gerhart Frank no longer considers this species related to G.mostii, valnicekianum, or oenanthemum".

(On the accompanying illustration of this species, the flower section is by Mrs Nancy Swales and the plant, bud, and fruit are by Mrs Joan Hobart - all approx. full size).

There is a slide of this species in flower in the slide library, but not in fruit - A.W.C.

MICRANTHOCEREUS POLYANTHUS (Werd.) Backbg by A.F.H.Buining

(Translated by H.Middleditch from Succulenta 49.2:70).

After some hesitation over writing about the cereoid cacti of Brazil, it finally seemed to me appropriate to relate one thing and another about my experiences.

My hesitation arises out of the problems that exists with the cultivation of these quite interesting plants in our climate. Let us consider first, that today many cacti and - above all - succulents have been cultivated by cactophiles which earlier one avoided by a wide margin. Some people think nothing of the more ordinary sorts. Our knowledge of aspects of the cultivation of so-called difficult species is greatly improved.

I can therefore suggest that a specialist cactophile, for that reason, might wish to try, for example, the growing of different species of Pseudopilocereus Buxb., Micranthocereus Bkbg., Coleocephalocereus Bkbg., Austrocephalocereus Bkbg., Stephanocereus Berger, Discocactus

Pfeiff and Melocactus (Toum.) Link & Otto.

If he restricts himself to these species amongst others, then he must firstly construct a special miniature hothouse and provide for a quite high temperature in the winter months. If we realise how many cactophiles have to stoke up their greenhouses in the winter for the cultivation of orchids, then the growing of the aforementioned genera should not prove to be insurmountable.

And we know by this time what interesting plants there are in these genera.

The greatest problem after heating is, I suppose, the intensity of lighting. Here too a practical solution might be found with our modern opportunities for artificial lighting. I am not at all technically gifted, but I invite any of the many experts in this field to provide a review dealing with this subject in our Journal, one day. It seemed to me, in this connection, necessary that any additional lighting should not be given during the resting season of the plants, but only during the growing season. At this we have in our country many sunless days, or days upon which the intensity of the sunlight is much too weak. It would perhaps be worthwhile to carry out a few experiments with this. Who will offer themselves for this?

But I should tell you something about Micranthocereus polyanthus Werdermann. With my friend Horst I visited on two occasions a mountain slope near Caitite in Bahia, that looked all snow-white because of the quartz-sand. These small plants in particular occured there in masses. During our last trip I again wished to look for the original discovery-place of Werdermann - namely near Brejinho. Now it is not so simple as it may seem to look for such a place in Brazil, even when you know that the village must lie in the Province of Bahia. In this Province there are a very large number of Brejinhos - all similar villages - and which is now the correct one? Luckily we knew that it must be in the neighbourhood of Caitite and so we gambled on seeking it there near Brejinho do Amethistas, which lies by Caitite at a little over 1,000 meters elevation.

It was not easy to reach this place, but finally we came upon a hamlet with only one small street, and this street was merely a badly potholed sandy road. It was approaching the stifling heat of noon, although it was in the middle of winter. After much difficulty we found a woman willing to prepare a sort of meal for us, consisting of rice with a fried egg.

After this meal we wished to visit a German, who had worked an amethyst mine there for some 40 years. Alas, Mr.Dreker was in Caitite on an errand, but a young German married couple from Idar Oberstein, who were there to study, accompanied us up to one of the mines. It would take too long to tell you about this mine. After this very interesting visit, they accompanied us to the presumed discovery spot of Micranthocereus polyanthus (Werd.) Bkbg. Great was our alarm when we saw that these plants - probably through some disease or other - were ailing and practically exterminated. Only with great difficulty could we find a pair of poor stems.

If other growing-places are not to be found, then this interesting species would probably belong to the past.

The plant is half day and night flowering. Already fairly early in the afternoon the succession of small pink flowers are open. They were visited diligently by humming birds. Sometimes in the high season 30 - 40 small blossoms flower simultaneously, an unforgettable sight. In just the same way, the rose coloured fruits appear in groups. The seedlings of these plants look somewhat like young Espostoas, handsome white woolly, often with long silvery hairs at the base. These plants must be treated with great care and watering them is a matter of careful weighing up in relation to temperature and sunlight.

For a description of this plant I suppose I must refer to the original description of Werderman in 'Brazil and its Columnar Cacti' which for that matter is repeated word for word by Backeberg in his book.

It is remarkable that this plant, like so many others in Brazil, was never again sought and found by others after Werdermann. The dwarf columns which offshoot freely from the base, mostly become scarcely one meter high, depending on the nature of the ground. The ground surface was

covered with very acidic material, the already mentioned quartz-sand which is terribly coarse. In this quartz-sand one finds amongst the xerophytic shrubs a little humus from fallen leaves. From time to time among these shrubs we found in sheltered places Melocactus macrodiscus Werd. and nearer the bottom of the mountain slope in more moist wooded surroundings, Pseudopilocereus pentaedrophus and glaucescens, to which I still hope to come back one day.

MICRANTHOCEREUS POLYANTHUS (Werd.) Backbg. by C. Backeberg

(Translated by H.Middleditch from Die Cactaceae Vol III)
Syn: Cephalocereus polyanthus Werd., Bras.u.s. Saulenkakt. 114. 1933

Up to 1.25 m high, only branching from the ground; stem slender, bluish coating, later becoming grey, 3.5 - 5 cm diam., almost wholly covered with white wool - rather denser in the crown - and enveloped with spines; ribs about 15-20, a few millimeters high, straight upright; areoles about 1 cm apart, with 1-2 cm long white wool; radial spines ca. 20-30, somewhat inclined spreading, needle-like, whitish to golden yellow, 5 mm to 1.2 cm long; central spines not all clearly distinguishable, mostly about 3-7, of which 1-3 appreciably stronger, some up to 3 cm long, golden yellow or pale brownish, often even almost reddish; flowering region usually on the north-west side with an irregular pseudocephalium of longer wool and the spines changed to bristles, the ribs continuing as on the remainder of the plant; flower ca. 1.6 - 1.8 cm long; ovary and tube smooth, somewhat fluted longitudinally, pinky-red; floral leaves 2-3 mm long, the outermost pink, the inner most paler, almost cream coloured; at the base of the tube a crown of about 1 mm long scales; filaments white, style whitish, likewise the usually only three stigma lobes, shorter than the longest stamen; fruit 5-7 mm long, pinkish red, paler below, with flower remains and lid; seed 1 mm long, more or less egg to kidney shaped, with obliquely placed hilum, shiny brownish black, faintly dimpled. Brazil, Bahia, near Caetete, ca. 850 m.

MICRANTHOCEREUS VIOLACIFLORUS Buining spec. nov. by A.F.H.Buining.

(Translated by H.Middleditch from K.u.a.S. for July 1969).

Cactaceae columnares 1 m altae 4 cm diam., costis 14, 5 mm distantibus; areolis ovatis 2 mm longis, 1.5 mm latis, aculeis marginalibus 25 vel plus, usque ad 1 cm longis albis vel brunnescentibus centrali uno usque ad 2.5 cm longo, rubro; floribus ex pseudocephalio laterali albo vel brunnescenti orientibus, 23 mm longis, 7 mm diam. perianthio violaceo; camera nectarifera rotundata staminum filamentibus, stylo adpressis obclusa; fructus 11 mm longo, 9 mm diam. urnaeformi, viridi; seminibus ovato-reniformibus 1 mm longis, 0.75 mm diam., hilo ovali subbasali, testa nigra verrucosa in ordinibus foveolis interstitialibus magnis punctata. - Fundort: Chapada do Diamantina, Minas Gerais, Brasilien.

Columnar up to 1 m high, 4 cm thick with 14 fairly sharp ribs 5 mm apart, green, clothed with fine spines. Areoles oval, about 5 mm apart 2 mm long 1.5 mm broad with white to brownish hairs. Radial spines numerous, up to 25 or more, part pectinate adpressed against the ribs, part spread out starlike outstanding, transparent, white to pale brown; one red central spine up to 2.5 cm long is distinctly more robust. At flower-bearing age the areoles develop a pseudocephalium in which denser, white to brownish wool is developed. At the same time the number of red central spines also increases, but then only strong bristle-like. The pseudocephalium formation frequently occurs rather more zone-like, in which the flowers appear in annual rings. The flowers appear in this pseudocephalium not in close rows standing side-by-side as in Micranthocereus polyanthus, but always separate and more or less singly, often from previous year-zones as well.

The flowers are about 23 mm long, 7 mm diameter, cylindrical. The pericarpel is c.5 mm long and thick, somewhat tapered below, green, somewhat pinched in towards the receptacle. The nectar-chamber is rounded, 4.5 mm long and broad and becomes closely adjacent to the style in the lowermost part. It is closed off by the thickened covering of the lowermost filaments and is

completely filled with nectar.

The receptacle is 18 mm long, cylindrical, about 7 mm in diameter; above the narrowed part it is somewhat thickened. It is greenish red below shading over into brick red; it is furnished with a few miniature scales, of which the unattached reflexing part is darker red. The flower petals are c. 2 mm long, 1.50 to 1.75 mm wide, pointed, exterior violet, interior somewhat paler violet-blue. The filaments are white with yellow anthers, c. 4 mm long and uniformly distributed up to the upper edge of the receptacle wall. The style is 18 mm long, white and the white stigma lobes stand at an equal height to the anthers.

The fruit is 11 mm long, 9 mm thick, urn shaped, greenish, shading to pale reddish above, rounded below and somewhat tapered, flattened above on the fruit-lid and narrowed to about 3 mm. This latter (latter=fruit-lid? - H.M.) is about 6 mm in diameter, somewhat depressed at the edge, raised under the flower remains. The fruit is in shape, thickness of the fruit wall, and colour as well as in the fruit lid completely different from that of Micranthocereus polyanthus.

The seed is kidney shaped to obliquely truncated ovate, 1 mm long and 0.75 mm thick and black. The testa has - in contrast to that of Micranthocereus polyanthus which is almost polished and only finely stippled with depressions - fairly robust shallow tubercles in irregular rows with large depressions. Otherwise the seeds are similar to those of M. polyanthus. The hilum lies sub-basally and includes the micropyle with it. The perisperm is absent, the embryo is fat below the miniature cotyledons which are curled into a hook-shape.

Habitat. On rocks in the northern part of the Chapada do Diamantina at about 950 m altitude, Minas Gerais, Brazil. The plant was found by Leopoldo Horst and myself on June 24th 1968. Up till now we could trace it only in a solitary very restricted area and between sandstone rocks. It grows there together with a probably yet undescribed Brazilian cereus and a wonderful blue coated Pseudopilocereus species, which instead of white wool with yellow spines, carried deep red-brown wool and spines. In addition many Bromeliads and orchids appeared thereabouts.

We found three specimens in full bloom. The weather was sunny and warm and the very fine coloured flowers were visited enthusiastically by humming birds. This species is also a day flowerer. As far as I know, this is the first Micranthocereus that has been found in Minas Gerais.

The species name refers to the very striking colour of the flower petals. Our collection number is 275. The type material was deposited in the Herbarium of the Utrecht University.

MICRANTHOCEREUS VIOLACIFLORUS Buining by A.F.H. Buining.

(Translated from Succulenta for March 1970 by J.R. Chapman)

This plant was described in "Kakteen und andere Sukkulenten" for July 1969, pages 129-130.

It was found when Leopoldo Horst and I were on our return journey from the north eastern and eastern parts of Brazil, in June 1968. As we travelled through the northerly part of the state of Minas Gerais, an area unknown to us, Horst sighed after one already lengthy hike, a wish that we might yet find just one unknown cactus species amongst the parade of red, violet, yellow and white colours.

After we had consumed a rudimentary lunch in the solitude, we moved further westwards and met a chain of mountains. The poor, narrow twisting path led up to a pass.

All at once on this pass at around 950 m in altitude, we both began to shout, for there stood the plant of Horst's dream in its full glory. On the front cover of this number (of Succulenta - H.M.) you can admire it in full colour. In nature, and thus in reality, the colours were warmer and richer - nevertheless I hope you might be able to imagine a little how enthusiastic we were. We marvelled at the plant standing there in full bloom and then collected what seed there was.

The flowers were being visited by industrious, superbly coloured humming birds, obviously necessary for a rich fruiting.

The plant differs from the familiar Micranthocereus polyanthus of Werdermann and also the one new species we found in the middle of Bahia, so that a description was fully justifiable, and for the full description of this little but extremely fine and handsomely coloured Cereus you must refer to the above mentioned publication.

We found also in this same locality, an unknown species of the genus Brasilicereus and another very fine new species of the genus Pseudopilocereus Buxbaum. The latter is a very vigorous plant, 3-4 m tall, a glorious blue when mature with 5, more rarely 6 ribs, covered in dense reddish-brown wool.

These last species have yet to be reviewed. A rewarding, lucky day which certainly does not happen very often.

THE GENUS MICRANTHOCEREUS by Prof. F. Buxbaum

(Translated by R. Moreton from Krainz "Die Kakteen" 1. VII: 1968)

The original description of this genus first appeared in C. Backeberg's "Blatter fur Kakteenforschung" in 1938, the generic name being based on two Greek words and signifying 'small flower'.

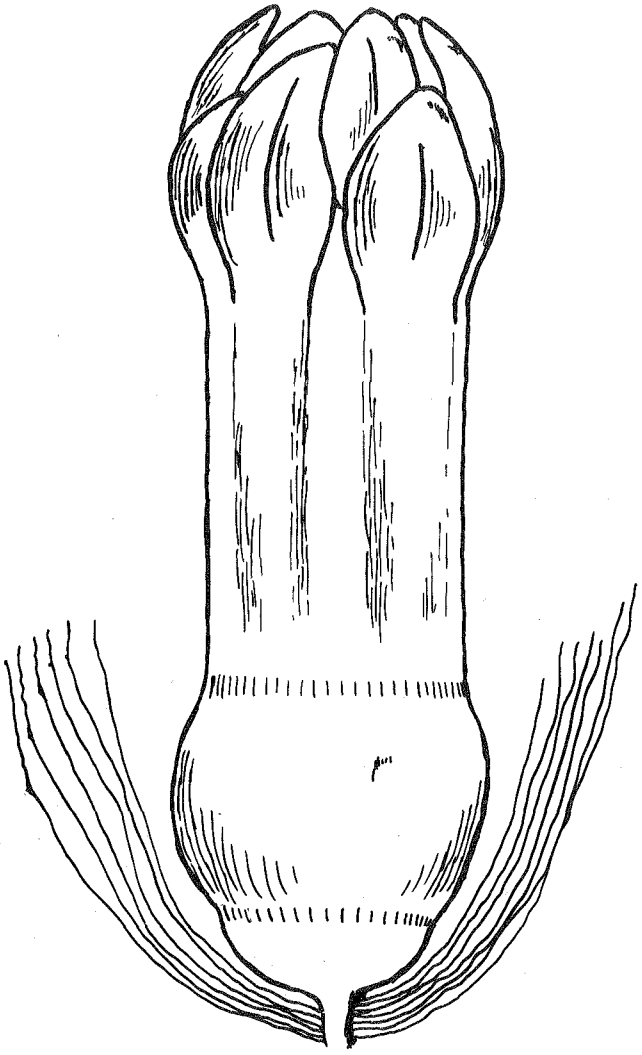
Backeberg used as his type species Cephalocereus polyanthus which had previously been described by Werdermann in his book on "Brazil and its Columnar Cacti". The original diagnosis by Backeberg for the genus Micranthocereus ran as follows:

"Flores minimi e pseudocephalio plurimi orientes; tubo brevissimo glabro paullum striato; interno basi coronam squmiarum 1 mm longarum gerentes; fructus operculatus, minimus, glaberrimus".

Buxbaum then puts forward an emended diagnosis as follows:

"Cactaceae erectae columnares mediae basi ramosae, costatae; flores ex pseudocephalio (sensu Werdermann) laterali orientes, parvuli, tubiformes pericarpellow minuto et receptaculo cylindrico nudis, petaloideis; receptaculo cylindrico aliquot striato; perianthio brevissimo, perianthii foliis ovatis. Staminibus primariis supra cameram, nectariferam magnam ex protrusione axillari tenui orientibus, corum filamentis squamulas minutas anguste triangulares protrusionem axillarem continuentes forminantibus sed sub antherum in bartem brevissimam capillarem transeuntibus. Pistillum tenue stigmatic partes lineares; funiculi ovulum breves ex basem communem fasciculati, simplices. Fructus parvus, glaberrimus, roseus, carnosus et succosus. Semina parva oblique subovoidea usque reniformia, nigra, nitida, hilo subbasali ovato porum micropylarium includenti; testa brunneo-nigra applanatnissime verrucosa, itaque sublaevis et foveolis interstitalibus punctata."

"Upright columnar cacti of medium height, branching from the base, with numerous low ribs and dense needle-like spination. Flowers from an untidy side pseudocephalium (sensu Werdermann), often very numerous, very small - under 2 cm long - cylindrical tube-like with very short perianth. Pericarpel very short, rather inset. Receptacle cylindrical, in the vicinity of the large nectar-chamber somewhat swollen, perfectly plain and bald, rose-coloured; faintly grooved downwards from the base of the lowermost outer petals. Other petals somewhat thicker, broadly oval, pointed, darker, inner petals thinner, paler, rose coloured to almost white. Above perhaps the lowermost third of the length of the receptacle, comprising an ovoid nectar chamber, the receptacle wall is somewhat thickened inwards and at the upper edge of this thickening occurs a short, thin diaphragm leaning conically towards the style, which is divided in the upper part into a wreath of pointed triangular scales. These scales were considered by Werdermann to be staminodes but are really the primary stamens; each scale carries at the tip a hair-fine thread to the anther barely 0.35 mm long, that on account of its fineness and frailty has been overlooked until now.



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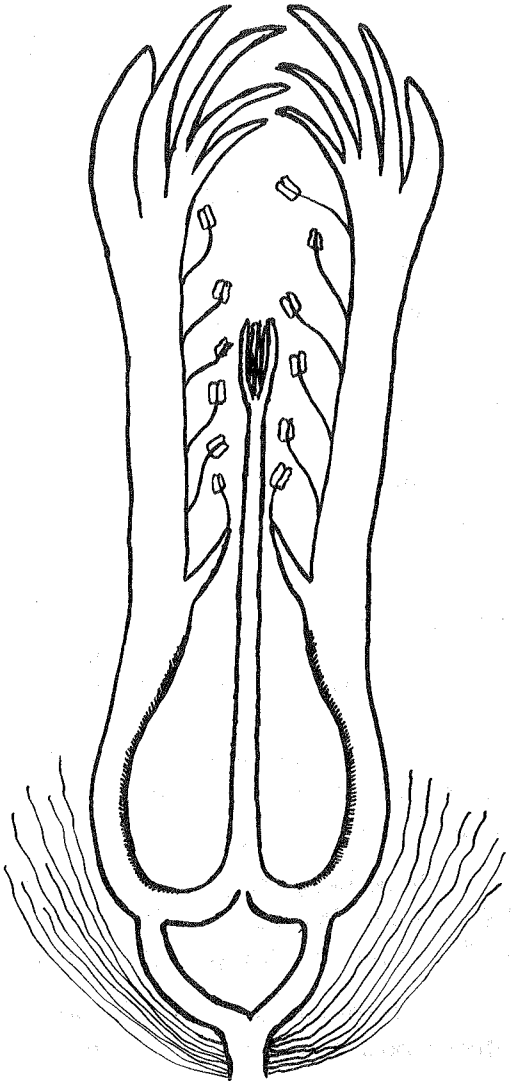


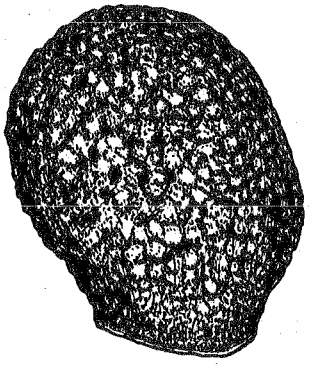
MICRANTHOCEREUS POLYANTHUS

Flower & Section AFTER BUXBAUM Die Kakteen I. VII:68

Micranthocereus polyanthus

SEED

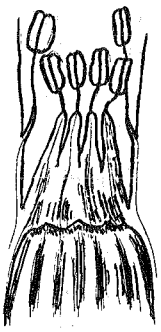
Die Kakteen I. VII: 68



Micranthocereus violaciflorus

SEED

K.u.a.S. 20.7 :69



Micranthocereus polyanthus

DIAPHRAGM ABOVE NECTARY CHAMBER

Die Kakteen 1. VII:68

The secondary stamens are inserted over the whole of the receptacle wall above, as far as the top edge; with hair thin filaments whose length scarcely surpasses that of the anthers. Style thin, with stigma lobes in the same line. Seed attachment by short seed strings bunched from a shorter foot-stalk. Fruit small, rose coloured, bare, shiny, fleshy and juicy, the flower remains carried on a corking "lid". Seed small, sloping egg-shaped to almost kidney shaped, shining brownish-black, faintly keeled, with subbasal, oval hilum within which is the micropyle. Testa almost smooth because of the very marked flattening of the tubercles, on account of glistening the small depressions indented in rows."

Discovered, according to Werdermann, on crystalline sandstone rocks by Caetite, Bahia, Brazil.

All of Werdermann's material, including the living plants, were destroyed during the war in Berlin-Dahlem. Since no further expeditions took place to Brazil, Micranthocereus polyanthus has remained a lost species since that time, until it was rediscovered and imported in 1966/67. Werdermann's very careful description and his photographs at the type location and magnified pictures of the seed enabled certain conclusions to be drawn which can now be confirmed through detailed research.

The "crown of 1 mm long scales (staminodes)" at the base of the receptacle infers a connection with the subtribe Borzicactinae (=Loxanthocerei Backeberg - H.M.), since only in Morawetzia doelsiana are such triangular staminodes known. The tubular shape of the flowers and the very short perianth bear a degree of similarity to Cleistocactus whilst the photographs of the seed showed these to be of a similar type to Cleistocactus.

As a result of the latest studies, all this can now be fully confirmed. The young plants develop at their base a thick crown of diagonally projecting wreath of bristles, up to 10 cm long. This form of a striking crown of bristles has also been described in Espostoa blossfediorum and occurs also (according to P.C. Hutchison) in Facheiroa ulei. In addition, the scale-like basal parts of the primary stamens, which in fact constitute an indented axial projection, has a parallel but earlier stage in the "nectary" of Cleistocactus baumannii.

What is described as a "basal fusion of the stamens" is always a more or less distinct formation of the axial projection, which in the most closely related genus Arrojadoa is very slight, but in Micranthocereus however forms a very definite conically arising diaphragm, to which the very conspicuous widening of the filaments of the primary stamens is conjoined. The widening of the filaments of the foot of the primary stamens is very frequent in the cactus world. Such a diaphragm-like formation of the axial projection ("fusion of the bases of the stamens") is very widespread in the tribe Trichocereae and is thus a typical characteristic. This characteristic is never encountered in the tribe Cereae, to which the Brazilian Pilosocerei - or Pseudopilocereus - and the related Austrocephalocereus, belong. In this latter tribe the axial projection is met with at the most as an area of thickening of the receptacle wall, which in appearance is "channelled" from the base of the filaments.

Micranthocereus therefore belongs to the tribe Trichocereae, subtribe Borzicactinae.

This article in its original form included more extensive references to the systematics of this genus, utilising terminology which would no doubt be most appropriate in an academic botanical paper. In consequence the above notes are merely an abstract and adaptation of the original article. - H.M.

THE CEPHALIUM BEARING CACTI OF BRAZIL - 3 by F. Ritter

(Translated by E.W. Bentley from K.u.a.S. 19.6.68.)

(Continued from Chileans No. 13 pp 137 - 140)

The connection of Coleocephalocereus with Cipocereus is less close than with Melocactus. Perhaps Coleocephalocereus decumbens comes nearest, a thin, half prostrate cereoid with ribs and spines that resemble those of Cipocereus and with a very slender cephalium. Considering the flowers, however, Coleocephalocereus aureus shows the greatest resemblance to Cipocereus; the flowers of this species have the same uniform green-yellow colour of the perianth leaves as Cipocereus pleurocarpus that is otherwise unknown to me among the South American cacti, and the inner perianth leaves also have the same striking form, namely upright and bent sharply outwards only at the tips. A systematic derivation of Coleocephalocereus from Cipocereus presents no particular problems.

8. Micranthocereus, Arrojadoa, Pilosocereus, Stephanocereus and Gerocephalus.

All these remaining genera can also be traced back to Cipocereus. Apart from the form of the ribs and the more frequent spination, the very fleshy scales on the flower tube and the almost closed perianth leaves are characteristic of Cipocereus pleurocarpus. These last two characteristics are also found in Micranthocereus polyanthus, which species is appropriate as the first to form a cephalium at the beginning of the development of the genus. In its inner structure the flower of Micranthocereus polyanthus already shows all the differentiations typical for Micranthocereus. Likewise the fruit shows all the characteristics for the genus that are peculiar to it alone.

The most remarkable Micranthocereus is probably my FR 1416, from the Licnio Almeido area in South Bahia, specifically because it only rarely reaches the cephalium forming stage and thus rarely flowers. I was unable to find any flowers or fruit or even the remains of them. No wonder that it was only to be found in a very small area, with particularly specialised soil conditions. It would be too much of a diversion to discuss what effect such a reduction in fertility has on the course of natural selection.

The fleshy scales and the very slightly open flower of Cipocereus exist also in another development line which must also have originated from Cipocereus, namely Arrojadoa, which forms a terminal cephalium. Here the fleshiness of the scales has its most extreme development and has also passed on to the petals, which lends to the flower a most peculiar appearance. These very thick petals turn out to be a protection against insect attack. I frequently found partly eaten flowers in which the insects had found so much food in the outer petals that they had not eaten through to the inner organs of the flower.

Internally these flowers vary in comparison with those of the other cephalium bearers and Pilosocereus in as much as all the stamens have kept their inclination towards the style. The flowers are also self fertile. The Arrojadoa fruit is also very specialised. On it sits the rotted and then dried up remains of the flower.

That Pilosocereus is also derived from Cipocereus is shown by the species minensis. It was not described by Werderman as Pilocereus (as Pilosocereus was called earlier) but as Cereus. Backeberg referred it to Pilocereus and created the sub-genus Mediopilocereus. I have pointed out in my publication of Cipocereus pleurocarpus (not yet in print) that is is nearer to this species than to the genus Pilocereus, so that it must be transferred to this genus. In other respects however it shows quite definitely the development which has led from Cipocereus to Pilosocereus. It is therefore a still living connecting link of peculiar interest.

Stephanocereus branches off from the evolutionary line which leads from C. minensis forms to the typical Pilosocereus. This is shown by the fruit which has already developed the typical peculiarities of the Pilosocereus fruit; also the positioning of the lower stamens shows it. However, this branch has undergone the special development of the terminal cephalium which is often grown through and the greater differentiation of the flower.

Micranthocereus

Habit -	Cerei with lateral cephalium ½-21 m high upright or dividing from ground level, soft fleshed young plants much thinner than old.
Ribs -	numerous, low, crenate, rounded.
Cephalium -	lateral, wool less fine and thick than in Coleocephalocereus, always coloured. Bristles finer and straighter. Cephalium not sunken in the stem. Under the covering this is rather flattened, with enlarged, very close areoles.
Areoles -	thick.
Spines -	numerous, needle-like, straight less flexible.
Flowers -	nocturnal, small to medium, in the younger part of the cephalium but not so markedly zonal as in Coleocephalocereus.
Ovary -	mostly wider than long, without constriction above, with few or no scales.
Nectary -	short with wall projection above.
Tube -	tubular to slightly funnel form much longer than the nectary, naked with a few small scales.
Stamens -	basal stamens in one row, thickened, forming a developed or undeveloped diaphragm. Ends with anthers not bent back against the wall. Above this is a gap, the upper series being a wall covering short to almost filament-less placing of the anthers on the wall.
Petals -	rather short, outer ones (in M. polyanthus) fleshy, upright, the inner ones only slightly opening. Otherwise rotate, inner petals white, red outside.
Fruit -	round, flattened above, mostly rather shorter than thick, red, unribbed, the area bearing the dried flower remains not sunken, takes all the area of the end of the fruit and extends a further 1 mm over the edge, without operculum; receptacle wall thin, skin not refractive of light. Flesh juicy and transparent in non-exploding fruits or pulpy and white in exploding fruit.
Seeds -	matt to shiny, fine and deeply tubercled. Hilum oval, slanting.
Distribution -	central to south of Bahia, north of Minas Gerais. 7 species are established all isolated from one another. (previously 3 were known).

Comments on the genus Micranthocereus

... from E.W. Putnam

"At the cost of putting aside other things I did manage to dash down to Brighton to hear the talk given by Albert Buining and this was a most rewarding occasion. I foresee a brisk demand for species of Micranthocereus and other lesser-known Cerei in the near future after Albert's marvellous slides of flowering specimens."

... from A.W. Mace

"Buining described the discovery of M. violaciflorus in his recent lecture to this Branch. It is indeed the amazing coloration claimed, in the slides of the species in habitat.

"The plants are proving very difficult in cultivation. One plant in this area has flowered but collapsed shortly afterwards. Mine has been slowly drying up from the bottom over the last two years. The cephalium on this plant consists of short red-purple bristles and does not appear

to be deeply inset. The flowers have somewhat of the appearance of thos of Arrojadoa although I can see Buxbaum's point about their similarity with Cleistocactus, which had not occurred to me before. The plant bends over slightly at the top, the cephalium leaning downwards.

"I have some seedlings of Micranthocereus polyanthus so I can only make observations on these. The amount of wool seems to be very variable; one plant certainly looks like an Espostoa, another has hardly any wool at all. I do not see any sign of the collar of bristles like Espostoa mirabilis. Kept at 60°F, these seedlings do not seem too difficult, although not fast growing.

"Another plant I have under the number HU 221 has dense orange spines; the cephalium consists of orange bristles and small tufts of wool. This does not seem too difficult to cultivate but has not yet flowered for me."

... from H. Middleditch

"On our Cactus Tour to the Riviera in 1967 we paid a visit on Mr. Kronlein at the Jardin Exotique at Monaco. He was very proud of a number of small freshly imported specimens of Micranthocereus, Stephanocereus, Melocactus, and other Brazilian cephalium bearing cacti which were not then yet established. Regrettably we did not appreciate at that time that we were seeing virtually the first plants to have been imported into Europe from north-eastern Brazil since the visit to those parts by Werdermann in 1930. Prior to this, in the year 1915, Dr. Rose (of "Britton & Rose") had traversed part of this region and he not only observed some plants which had already been described but also discovered a new plant to which he gave the generic name Zehntnerella.

"At an earlier date - in 1906-07, Ernst Ule made a collecting trip through N.E. Brazil for the Berlin Dahlem Botanic Gardens. Amongst the newly discovered cacti which he collected were Austrocephalocereus dybowskii, Arrojadoa penicillata and A. rhodantha, Stephanocereus leucostele, and Coleocephalocereus purpureus Gurke non Werd. At the time of their discovery and diagnosis the Arrojadoa and Stephanocereus were placed under the genus Cereus, and the other two plants under Cephalocereus. It was Britton and Rose who established the new genera of Arrojadoa and Stephanocereus for these particular plants not only on account of their annual ring cephalium but also because the flowers and fruit were different to Cephalocereus.

"To judge by the material in Schumann's 'Gesambeschreibung der Kakteen' it would seem that Ule was the first to collect cacti from north-east Brazil; plants of Leocereus were known in 1890 but these were found not far from the long-established mining areas in Minas Gerais.

"A comparison between the seed of the genus Micranthocereus and that of Coleocephalocereus (Chileans No.21) will show that they differ both in shape and in the character of the testa, but no more so than do the seeds of the various groups of Gymnocalycium. The fruit of Micranthocereus is squat and nearly as broad as high, so differing from the top-shaped fruits of Coleocephalocereus - but again no more so than do fruits of the different groups of Gymnocalycium. The flowers of Micranthocereus appear to be comparable in size and shape and formation to those of Coleocephalocereus (Buiningia section) although they tend to seem longer since they are carried on a pseudocephalium and are not partly buried in a cephalium as in Coleocephalocereus. The flowers on Coleocephalocereus appear at or not far below the shoulder of the plant in strict order of areole maturity, whereas on Micranthocereus they are more strung up and down the pseudocephalium - as can be seen from the slide in the slide library taken by J.C.Chapman reproducing the habitat photograph of Micranthocereus violaciflorus by A.F.H. Buining from the cover of "Succulenta".

"It is of interest to consider the inter-relationship of the size and shape of the flower on Micranthocereus and the pollinating agent - in this case humming birds, as Mr Buining tells us. It would seem to be a very small flower for such a large pollinator - perhaps this would be the cause of the brightness of the flower, to compensate for its size in catching the eye of the birds. Being a very small flower one supposes that its nectar cannot be taken by any other agent except perhaps very small insects which could crawl into the barely open flower; presumably they would then not be capable of either passing the diaphragm formed by the bases of the primary stamens,

either bodily or with a proboscis. The humming bird, however, will be quite capable of pushing its beak past this diaphragm to reach the nectar; being quite a large animal it would hardly be satisfied with a flower which provided a mere sip of nectar (which would be a feast for a tiny insect) and so the flower of Micranthocereus will be found to have a nectar chamber quite out of proportion to the rest of the size of the flower. It will thus be seen that the construction of the flower which is shown in the accompanying illustration is not a matter of fads or fancy on the part of nature but is developed for a precise and specialised task. Likewise the humming bird cannot drink out of this small flower on a spiky and slender plant without remaining stationary in mid-air, so once again the ability of the humming bird to hover is not a fad or fancy of nature but is a deliberate development for a specialised purpose.

"It will thus be seen that the specialised characters of the flower and of its prime pollinator are interdependent and this will be found to be the case with many other flowers (not only cacti). It is for this reason that the nature of the construction of the flower provides a useful and valuable guide when classifying and identifying a plant and this is why we devote a fair proportion of our pages to this aspect.

"On this account it is to be expected that plants which use the same family of pollinator will themselves probably be fairly closely related. It is therefore of interest to see the comment in the article on the "Linz Botanic Gardens 1969" regarding the pollination of Cleistocacti flowers by humming birds and to relate this to Prof. Buxbaum's argument that Micranthocereus does have a relationship with Cleistocactus on account of the flower morphology.

"I regret to have to say that both my attempts at growing Micranthocereus polyanthus seedlings (about $3\frac{1}{2}$" high) have ended in failure. Perhaps others have been more successful.

"The two seed sketches in the accompanying illustrations will enable a further comparison to be made with any Cleistocactus seed which readers may have."

... from R. Zahra

"I have read about the beauty of Micranthocereus and I have tried to raise these plants from seed. I found out that they are a little difficult from seed and even then they grow very slowly. I compare their growth to that of Pilosocereus densilanatus HU 109 which I also find grows very slowly from seed. Besides M.polyanthus I also have one other Micranthocereus and that is HU 221. I think that the slow growth rate may be due to not having enough heat in the winter. All my plants are in an open greenhouse and have to go through the winter when temperatures here in Malta could drop to 43°F at times. It would be interesting to know how the seedlings behave in a heated greenhouse "

... from R. Moreton

"From experience in growing Micranthocereus from seed at Holly Gate I would say that they are not particularly difficult from seed, but for a Cereus they are rather slow. Bought in seedlings also seem to establish readily enough but we did lose some during the power cuts over the winter.

"A Micranthocereus sp. nov. from De Herdt seems to be very little different from M.polyanthus to me - and this raises the question of identification. Seed I had some years ago as M.polyanthus from De Herdt has produced plants which Buining has now provisionally identified as Pilosocereus gounellii - but these plants are quite different from those raised from N.C.& S.S. seed of P."gounellii" distributed two years ago! Again on this subject, seed from De Herdt of Coleocephalocereus (Buiningia) brevicylindricus and plants received from the Continent as Facheiroa ulei have been identified by Buining as Coleocephalocereus decumbens. Plants of Coleocephalocereus brevicylindricus from De Herdt and seed from Uhlig were correctly named. All of which goes to show the problems with names that are now around. Unfortunately very few people in Europe are qualified to speak on these "newer" cerei".

... from P.G.Waterman

"I have an imported stem of Micranthocereus HU 221 which is about 10" high. This took several months to settle down in my greenhouse; during 1971 it put out two new offsets from the base which grew several inches in length. This year a further offset appeared at the base quite early in the year - at the beginning of April - and this has put on two inches of growth in two months."

We have slides of a few species of Micranthocereus in the Slide Library. Any additions, especially of plants in flower, will be very welcome - A.W.C.

MY SECOND TRIP THROUGH BRAZIL by A.F.H.Buining

(Translated by H.Middleditch from Succulenta Sept. - Oct. 1968).

Although there remains so little time to me - after writing up my diary, the many notes about plants, and of the photographs of them and of the flowers, flower sections, and fruits - yet I will briefly say something about this second journey.

Herr Horst and I travelled by Willys Overland jeep, in which nearly 800 - 900 Kg. of plants can be loaded. The strong six cylinder engine with four wheel drive brought us this far without leaving us in the lurch; at one time we went for a whole mile of road in tough clay-like mud right over the axles. With assistance from a whole legion of dark chaps and boys, lit up by thousands of glow-worms, we were helped out again.

Here this evening it is the feast of Saint Joan - the 23rd June - and while I sit and write here in Vitoria de Conquista, great fires of logs burn in front of the houses and crackers and rockets make a terrible din for hours on end. The feast lasts morning and afternoon and all business is closed down for it.

This time we have searched through the highly interesting sand-dune regions from Rio de Janeiro off towards the north as far as Vitoria. We found Melocactus violaceus, Melocactus melocactoides (which is rare and occurs only in one place); also Pilosocereus arrabidae which was more widespread, Cereus pernambucensis, Pilosocereus ulei (by Cape Frio) and an as-yet unidentified decumbent Cereus. A little way to the north of Vitoria we left the coast and found before long a Pilosocereus unknown to us. From almost all these plants I was able to take flowers, flower section, and fruit photographs.

Close by the village of Santa Teresina we visited the dwelling and garden museum of the famous humming bird expert Augusto Ruschii. He now suffered from a serious heart disease, after many years of intensive exploration over mountains and through virgin forest, so he received us on his bed. Many interesting subjects were discussed about humming birds and also about unknown plant localities - such as places in Bahia. In his splendid garden 28 sorts of humming birds flew around freely. These lovely miniature fliers were fed with sweetened water (20% sugar) out of bottles having plastic tubes at the base into which their fine - frequently very long - beaks fitted. In the breeding season many seem to leave for the woods and then afterwards return with crowds of young ones. In a busy day $\pm$ 25 Kg of sugar would be consumed.

These bottles hung everywhere round the magnificent house and it was quite delightful to see the bottles visited by these splendid little creatures. Some of them obviously had their own bottles and so hovered glittering before our eyes. In special huge cages there were many other sorts. After the traditional "cafe zinko" (baby coffee) we bid each other a cordial farewell.

Along our route to Vitoria de Conquista, we found a variety of interesting columnar cacti which are worth closer study. Amongst others, a columnar species with a yellow, brown, red-brown, or now and then even dark brown, cephalium with as many as 36 ribs. Up to now we have found this marvellous plant only within a very limited habitat. After Vitoria de Conquista,

from where we shall despatch the plants found since leaving Rio Grande do Sul and where I now sit to write after a journey of a week to the north, we left for San Salvador, the capital town of Bahia.

In the vicinity of the sand-dunes and in the neighbouring hilly country there grows some most interesting cacti.

We found Cereus pernambucensis and also Melocactus violaceus again. Melocactus violaceus is a small plant, which acquires a cephalium rather quickly. We wonder whether this species will be more easy to cultivate in Europe than those Melocacti known to us from Curacao and Surinam. In the hilly country we found Melocactus oreas together with the Melocactus salvadorensis described in the past by Werdermann.

From San Salvador the route went further towards the north. We came before long into the widespread habitat of Pilosocereus catingicola, enormous great branched treelike plants. There also occured in rocky places the very widespread Pilosocereus gounellei.

In his time here, Werdermann discovered and wrote about Pilosocereus tuberculatus, without sufficient acquaintance with the flowers and fruit and which according to him occured on only one or two limited places in Bahia and Pernambuco. We are now able to establish the connection of these two places and it appears that the habitat is much more widespread. The plant seems to be related to Pilosocereus gounellei.

Presently we were able to establish the habitat of Zehntnerella squamulosa which up till now has been fairly rare or at least pretty well unknown, after very extensive trips through lonely mountainous regions in the north-west of Bahia. The nectar chamber of this sole species grows enclosed by some sort of wool. This was established by the examination of a fairly large number of flowers.

The extent of the habitat of Pilosocereus piauyensis, which towards the north connects to that of Pilosocereus catingicola, is also very widespread. The more arid the growing spot, the more blue grew the colour of the skin of these great plants which are also branched and tree-like.

The habitat of P.dybowskii with its snow-white cephalium is very limited in the wild. In places they appear massed together, in company with Pilosocereus piauyensis. We remained for some days in this interesting locality and we were also able to find there the almost unknown Leocereus bahiensis - a particularly elegant and choice Cereus with handsome white night flowers packed with stamens.

On the afternoon of June 25th we leave here with an army vehicle for the famous Morro de Chapeau and the further unknown territory of the west of Bahia.

So far we have not had a single problem from the dangerous rattlesnake nor indeed from the other great variety of small insects of all sorts and forms which are found here.

It is difficult to continue from where my preceding narrative concluded, as my diary was seized by the police in Pernambuco, on account of a suspicion of espionage. I hope that I may find the diary in Arroio de Seca, where it was to be despatched if their suspicions are unfounded. These people found all those strange Latin cactus names with numbers of slides and colour films, most suspicious.

Leaving Pernambuco we came into the north of Bahia at Juazeiro. To the south of that place we again noted the splendid dybowskii.

However, we wished to collected certain cactus plants around Brejinho and Ignacio, that are mentioned in the well-known publication of Prof. Werdermann "Brazil and its Columnar Cacti". There are, however, five villages spread out over Bahia which are called Brejinho and Ignacio does not appear on the map at all.

During the police difficulties we were hospitably received and housed by two Dutch priests in Arcoverde. They really gave me fresh courage to go on although my stomach was alarmingly

rough. They thought that Brejinho was genuinely south-westwards from Juazeiro and that Ignacio was there as well.

Thus we went along little sandy trails along the east bank of the Rio Sao Francisco, observing that there were plants of the genus Zehntnerella appearing massed on the higher hills. We passed by the supposed Brejinho, but found nothing of note and nothing more of Ignacio. In this lonely and more or less uninhabited region there are many beasts of prey, so that in the evenings there are many goats collected in from some distance to the isolated houses, where they remain during the night inside tall fences.

To our great astonishment on one occasion we passed by a group of no less than 3 to 4 Kilometer in length of gypsies on horseback together with many loose horses with foals, cows, goats, poultry and even with turkeys, dogs and monkeys besides. The women, seated on horseback, smoked pipes and glowered angrily after us. Quite soon afterwards people asked us whether a tribe of gypsies were on their way and upon receiving our affirmative reply everyone started feverishly to fetch goods, goats, pigs and poultry inside their fences.

Further to the south we found in one solitary spot besides a rocky mountainside rich in iron-stone, a splendid Melocactus species with a pure blue skin colour and a white cephalium.

Words are hardly sufficient to describe our feelings when, after a week's search, we found Ignacio with the splendid Facheiroa ulei. This plant closely resembles a Zehntnerella but has a long cephalium which is as smooth as mouse fur. We wandered for several days in the surroundings of Morro de Chapeau. We collected Discocactus zehntneri, some species of Melocactus, Pilosocereus lehmannianus (this name must however be abandoned), Pilosocereus lutzelbergii, a new species of Micranthocereus, Pilocereus glaucescens and glaucochrous, etc.

In the Sierra do Sincora we found everywhere Pilosocereus purpureus (and about this there is much to relate).

We visited the pilgrimage town of Bom Jesus de Lapa upon the bank of the River Sao Francisco, where also a new Pilocereus appeared and a Quiabentia.

To the south of Caetite was at last the genuine Brejinho. There we found Werdermann's Melocactus macrodiscus and Micranthocereus polyanthus and great groups of splendid woolly Pilocereus glaucescens.

We came across a wonderfully pretty discovery in the northermost part of Minas Gerais. A micranthocereus species with long red spines, a whitish sort of cephalium, brick red flower tube, small violet petals and a redgreen fruit. Humming birds were diligently sticking their greedy tongues amongst the yellow anthers in the search for the abundantly filled nectar chambers. Further on was a plant like Pilocereus glaucescens, yet with no more than 5 ribs, redbrown spines and abundant redbrown wool. Also there grew at the same place Pilocereus minensis and a probably new Brasilicereus of a height of $1\frac{1}{2}$ meters at the most. It was a wonderful afternoon there.

On the road to Brasilia we found cacti at only one place and that probably a still unknown Pilocereus species. I find myself making use of the name Pilocereus in this travelogue; I hope to be able to publish details on this subject later.

We (Herr Horst and I) now hope to work for a few weeks round Diamentina. Today we found a variety of Uebelmannia pectinifera with spreading spines - which is a very very rare occurence - on horribly rough rocks, difficult and dangerous to ascend.

Pilocereus minensis stood in crowds in full bloom and fruit. A few clumps of this species had occasionally as many as 6 to 8 stems, with sometimes 40 blue fruits. It is remarkable that the bluish flowers (the petals are dirty white) are bald, whereas the fruits carry little bristles in the scales. A new Pilocereus (HU 103) likewise carried flowers and fruits on the handsome yellow spined crowns.

Only very briefly have I related our various experiences. After daily hikes in the hills, with myself now here in the full heat of the winter sun, bed beckons around 8 in the evening -

then the diary.

Comments ... from H. Middleditch.

"Some notes covering this trip, also written by Buining, appeared in the N.C. & S.S. Journal Sept. 1968, where the Micranthocereus with white cephalium and brick red flower tube was erroneously described as an Arthrocereus. Plants of Arthrocereus grow with long, thin, straggling stems, three or four angled: the white flowers are large and open at night: only two species grow in Bahia, the plant being far more common on the Caribbean coast of South and Central America and the West Indies."

EXTRACTS FROM 'BRAZILIAN ADVENTURE' by Peter Fleming.

It is about 130 miles from Goyaz to Leopoldina, our point of embarkation for the journey down the Araguaya. Towards evening the road dropped down off the hills into lusher country. This was the river valley. The road was level now, with a surface of thick white sand: We had left behind the red dust of the uplands. Palms now stood in ranks; hitherto they had been isolated phenomena, or else had preserved their grace with difficulty amongst a press of trees. The open country between the strips of jungle were dotted with little clumps of vegetation and single trees.

When paddling down the Araguaya, perhaps you passed close under the lea of a forest fire. Its bitter smoke rolled out across the river, and the air was full of the charred ghosts of leaves. Flames leapt and roared and ravaged among the desperate blackened silhouettes of trees. There was always a fire burning somewhere. It seemed to me that about a tenth of the interior of Brazil was perpetually in flames.

We reached the mouth of the Tapirape in August and camped at the foot of a little hill. It was not more than 300 feet high; I climbed one of the trees that crowned it. We were encouraged by the sight of what looked like big stretches of open country breaking the green opacity of the forest.

For five days I paddled all day, up the Tapirape, with the banks clothed with thick jungle. On the fourth day we came to a place where a long stretch of open campo came right down to the bank, without the customary intervening belt of jungle.

The twisting channel narrowed and the current grew stronger against us. There were places where the river was all but choked by falled trees. In the shallow we had to get out and drag the canoes through two or three hundred yards of knee-deep water.

On the next day, having camped by the river, the party strode off along a narrow winding path which led from the clearing. Before we had covered the second mile we had left the jungle which cloaked the banks of the river. The path wound through the campo towards the dim and distant hills. The country was open, but open with a bad grace. You could not see far. The tall sere grass stood up all round you, pricked with ant hills. And although you could see over the top of the grass, the trees - sometimes singly, sometimes in clumps - blocked your view.

Unburnt campo is heavy stuff to walk through, because the grass is long and thick and grows in tufts of which the base makes a fairly solid proturberance on the surface of the ground. But when it has been newly burnt, as this had, walking is almost as easy as on a road.

It was a strange country to be in, charred and desolate. Smoke from the fires which had ravaged it still thickened the air. All along the naked black ground ant hills stood up spikily. The swart little trees had a blasted look, though in reality the fire had hardly harmed them. There were sudden wide patches of bare black ground, sparsely flecked with grass-blades only a few days old.

We wanted to camp on the river (there was no other water available). We decided to make straight for the jungle and cut our way in to the river. All we could see was a wall of trees.

There was no high ground and none of the trees which we could climb were tall enough to give us a view over that enigmatic wall of green. In this rich green place, we thought, water would easily be found; we were wrong. We did come upon the bed of a shallow dried up lagoon. After an hour of frenzied hacking, there was the river.

We set off again next morning; early in the afternoon we came to a place where the campo came down to the river. We fired the tall grass then sat down and ate a little food, while the breeze took the flames and stripped the hindering grass from the beginning of the next stage of our journey. That afternoon, we trudged on through thick wasted grass between clumps of trees. A house agent with unusual self-control might have described the country as park-like. Two hours before nightfall we decided that it was time to make for the river. The campo here no longer skirted the bank. Once more there was a wall of jungle between us and the essential water; once more we had to enter it at hazard, hoping to strike the river's course.

On the day after we had waded up the river, I decided to take all our gear to the edge of the open country a mile upstream. An hour later we were on the edge of the jungle. Queiroz fired the scrub there and went back 400 yards to the river bank.

I stumbled through the long grass making for a distant clump of very tall trees. We came at last to that clump of very tall trees, crossing the bed of a dried up pool which had given the trees their extra cubits. We piled our equipment and climbed up one, to the last forks sixty or seventy feet above ground. We had a magnificent view. Open country, quilted with the tops of close-set clumps of trees, stretched as far as the eye could reach. Last night's smoke lingered as a tenuous haze. Looking back along the way we had come we saw the smoke of Queiroz's fire. We swarmed down the tree, picked up our equipment and made for the jungle.

By the time we reached the river it was past noon. We hesitated to strike back on to the campo where the going was better. Queiroz's fire had spread swiftly over a hugh tract of country, obliterating our landmarks.

Back at camp, I wanted to have a look at the lie of the land. As usual, the open country on the other side was less open than it looked. About 400 yards inland there was a belt of low scrub and on the edge of it stood a tree which I climbed. The sky darkened, massed black clouds assembled in the west and came up across the sky. The earth was ablaze; the fire which the Indians had lit raced forward under the clouds and on to the other side of the river a long line of flames was leaping out across the campo we had fired that morning. A dead tree close beside me went up in flames whilst the fire was still half a mile away.

Then the storm broke. It opened first a fire of huge and icy drops. The rain fell in sheets and with ferocity; it was ice-cold. It beat the placid river into a convulsive stew. Thunder leapt and volleyed in the sky. The rain beat land and water till they roared.

The thunder drew slowly off, the rain fell with less force. I slipped into the river and found it so warm that I wished I had gone into it to shelter from the numbing rain.

We had to admit that it looked as if we had seen the beginning of the rains. Local opinion set their advent for early September and these were the last days of August. The two storms in the last week were the first rains we had seen in Brazil.

The above account relates to the next major river but one running parallel and to the west of the Sao Francisco. However, the countryside immediately to the west of the river Sao Francisco will be very similar to that described in this account, with gallery forest along the river banks and the intervening ground covered by campo with grass and odd patches of palms or other trees. It also affords yet a further example of the practice of the Indians in firing the dry vegetation, which is so widespread throughout South America - H.M.

EASTERN BRAZIL

The section of Eastern Brazil depicted on the accompanying map lies between the middle reaches of the River Sao Francisco and the Atlantic coast. This region, overlapping the borders between Bahia and Minas Gerais, may be located in relationship to the rest of the eastern coast of Brazil from the map which appears on the frontispiece of Chileans No.7.

The region depicted on the accompanying map is only a part of a much larger area covered by the eastern Brazilian Highlands. These highlands are basically a very ancient crystalline rock, overlain by almost level and unfolded sedimentary beds. On account of the very great age of the rocks in this part of South America, the surface almost completely lacks sharp pointed peaks; the less weather-resistant strata appears as well rounded slopes, the more resistant strata appears as plateau-like blocks with quite steeply sloping edges. The highest points of ground are all of fairly similar altitude, being not much in excess of 3,000 ft. The rivers have excavated broad valleys in the crystalline foundation rocks, leaving the sedimentary strata as relic caps. A particularly broad valley has been formed by the River Sao Francisco, well below the surrounding highland rim.

Although they are free of folds, these rocks are affected by faults and a very extensive fault with a large throw runs parallel to the coastline on the map. This fault produces an outstanding escarpment which occurs more or less a hundred miles inland from the coast, running all the way from Salvador to Vitoria and as far again to the south of Vitoria. At Rio de Janeiro this escarpment exceeds 2,000 ft in a single rise, but somewhat less in Espirito Santo and it gradually decreases in magnitude northwards to Salvador.

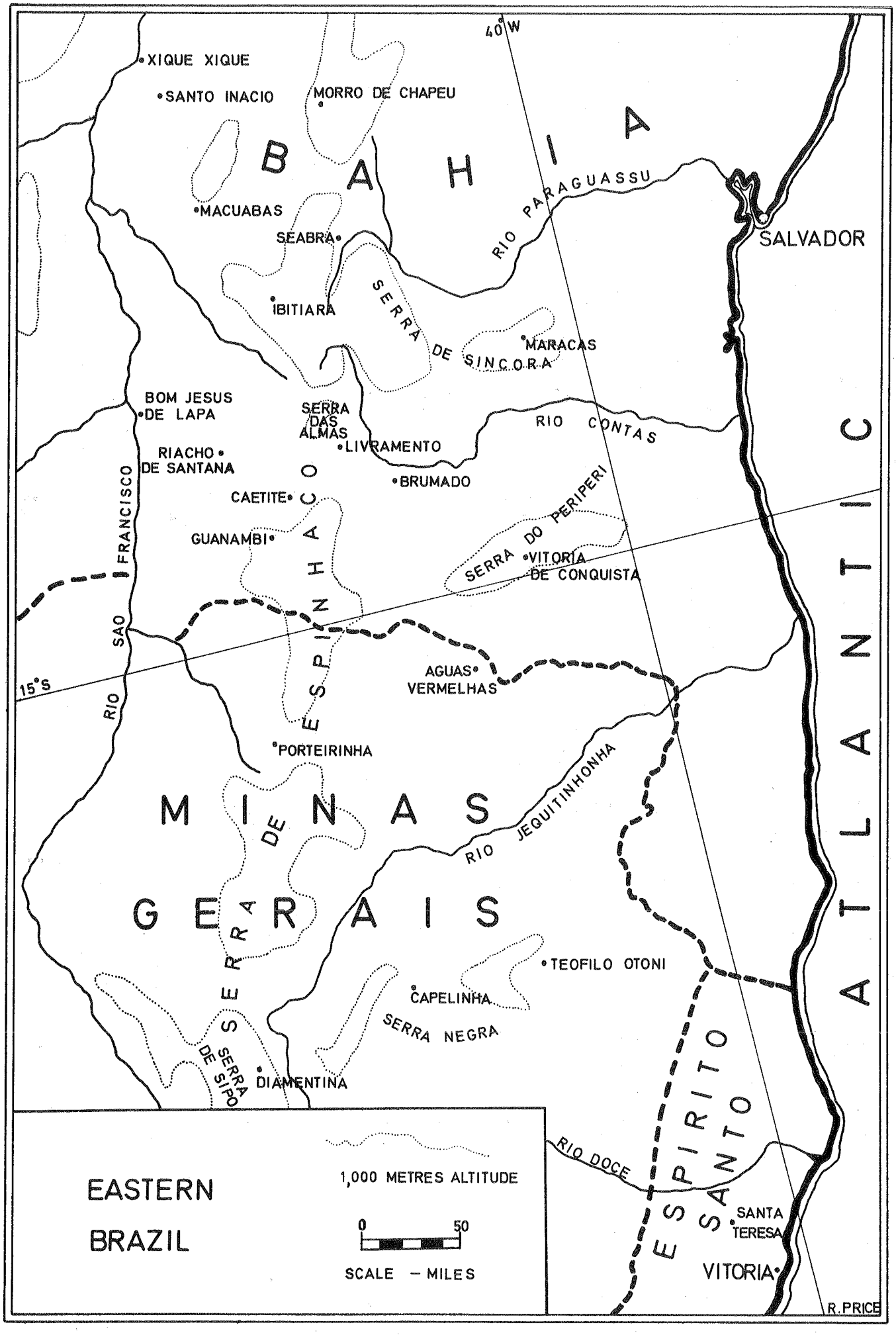
Climatically this area is unusual in the degree to which it is directly affected by the subtropical anticyclone which has a stable location all the year round over the South Atlantic. In winter when the sun is overhead in the northern hemisphere, this anticyclone extends its influence for over a thousand miles inland over the Brazilian highlands. Just as anticyclones will bring dry days with blue skies to Europe - because they comprise a body of warm, dry, descending air - the South Atlantic anticyclone brings dry weather to the greater part of the eastern highlands of Brazil during the winter months.

At irregular intervals the eastern coast of Brazil also comes under the influence of large masses of cold air which have travelled all the way from subantarctic latitudes. These cold air masses flow northwards in the lee of the Andes, over Argentina and into Brazil. The rising mass of the Brazilian highlands retards the centre of the onflowing mass of cold air or else divides it into two streams, one stream flowing northeastwards along the coast of Brazil. The winds which mark this air flow are distinctly cooler than the normal subtropical or tropical air and are described locally as a "friagem". This cool air mass will flow up the coast of Brazil underneath the warm subtropical air and during the winter months will frequently travel so far north as to reach even beyond Salvador.

The interaction between this cool subantarctic air and the warm subtropical air greatly modifies the character of the onshore winds over the coast of eastern Brazil and produces extensive rain showers. As these onshore winds have to rise quite sharply on encountering the escarpment they yield a heavy rainfall over the immediate coastlands. The more gentle rise thence to the heights of the Serra de Espinhaco yields a rainfall distinctly less than that at the coastlands. The steep slopes bounding the upland plateaux often obtain a somewhat higher local rainfall than that on adjacent uplands.

The northward flows of cold air over the east Brazilian coast occur with sufficient frequency and travel sufficiently far north (beyond Salvador) to generate a reasonably reliable winter rainfall for the eastern half most of the region shown on the accompanying map. However, during these same winter months the whole of the broad Sao Francisco valley will enjoy very little rainfall indeed, being under the influence of the warm, dry, descending anticyclonic air.

With the approach of summer and the southward march of the sun, the influence of the high pressure anticyclone weakens and in the month of October the area on the map comes under the


40°W
XIQUE XIQUE
SANTO INACIO
MORRO DE CHAPEU
BAHIA
MACUABAS
SEABRA
RIO PARAGUASSU
SALVADOR
IBITIARA
SERRA DE SINCORA
MARACAS
BOM JESUS DE LAPA
SERRA DAS ALMAS
RIO CONTAS
LIVRAMENTO
RIACHO DE SANTANA
BRUMADO
CAETITE
SERRA DO ESPINHAÇO
SERRA DO PERIPERI
GUANAMBI
VITORIA DE CONQUISTA
RIO SAO FRANCISCO
15°S
AGUAS VERMELHAS
PORTEIRINHA
MINAS GERAIS
SERRA DE
RIO JEQUITINHONHA
TEOFILO OTONI
CAPELINHA
SERRA NEGRA
SERRA DE SIPO
DIAMENTINA
ESPIRITO SANTO
RIO DOCE
SANTA TERESA
VITORIA
ATLANTIC
EASTERN BRAZIL
1,000 METRES ALTITUDE
0
50
SCALE — MILES
R.PRICE

influence of the moist Trade winds, the North Atlantic Trades from Amazonia and the South East Trades from the South Atlantic. These bring huge quantities of moisture laden air to the eastern highlands of Brazil, yielding an ample rainfall to all parts with the exception of the "shoulder" of Brazil north of Salvador. That region continues to remain under the influence of anticyclonic air. The more southerly location of the climatic equator in the summer months discourages the polar air masses from flowing as far north as they do in winter, so they have almost no influence north of the latitude 15°. The influence of the anticyclonic air is not entirely absent from the area covered by the map insofar as central Bahia is not as well watered as central Minas Gerais during the summer months. Around Diamentina about 12" of rain falls in January while Salvador receives less than 4" during that same month. Once again the broad Sao Francisco valley receives markedly less rainfall than the highlands surrounding it.

In consequence of the varied topography and rainfall controls there is a wide range in rainfall patterns in the area shown on the map. In winter the coast is very wet, the uplands between the coastlands and the Serra de Espinhaco are only moderately wet, the Sao Francisco valley and the area around Diamentina is very dry. In summer the coastlands are not as wet as they are in winter but the uplands are wetter, the Sao Francisco valley is less dry than in summer and around Diamentina is very wet indeed.

Annual Rainfall and Temperature

(a) temperature in °F (b) Rainfall in inches

		J	F	M	A	M	J	J	A	S	O	N	D	Annual Total
Salvador	(a)	80	80	80	79	77	75	74	74	75	77	78	78	
154 ft.	(b)	2.6	5.3	6.1	11.2	10.8	9.4	7.2	4.8	3.3	4.0	4.5	5.6	74.8
Teofilo	(a)	78	78	77	75	71	70	67	69	72	75	75	76	
Otoni	(b)	7.5	4.9	6.1	4.5	3.0	1.1	1.2	0.8	1.3	4.0	7.9	9.4	51.7
Caetite	(a)	73	73	73	73	70	67	66	68	71	73	73	72	
2953 ft.	(b)	4.8	2.9	3.0	3.5	0.6	0.4	0.5	0.3	0.9	2.5	4.6	5.6	29.6

These temperature and rainfall tables are for three places marked on the map, Salvador on the wet coast with reasonably all year round rain; Teofilo Otoni on the highlands with a dryish winter and wet summer - the temperature not as high because of the greater altitude; and Caetite on the edge of the Sao Francisco valley with a very dry winter and a wettish summer - cooler still because of a further increase in altitude. The quite distinct division between the wet and the dry season is clear from the last set of figures, the onset of the rainy season being graphically described in the accompanying abstract from "Brazilian Adventure".

On the coast the distribution of the rain fairly well throughout the year produces a band of thick tropical jungle. Between this jungle and the Serra de Espinhaco the hilly uplands are clothed with "mata" or mountain forest. In the lower river valleys galleries of dense forest originally hid the river from the gaze of the traveller unless he was stood directly on its banks. Elsewhere on these hills the mata will vary from tall trees growing fairly densely on the better watered parts, particularly on soils weathered from the crystalline rocks, to more open and more stunted growths on less favourable slopes and on more sandy soils. The steep slopes of the edges of the tablelands are clothed with a fairly thick tall growing xerophytic forest; wider areas of the Sierra de Espinhaco are occupied by thorny scrub and low bushes, perhaps with scattered dwarf trees. This xerophytic vegetation also covers great areas in the Sao Francisco basin. Intermingled with the thorn scrub are open grasslands carrying patches of palm or other trees.

The open savanna-like grasslands with patches of trees through which travel is not too difficult, are termed 'campos' (or open pastures); the closer thorn-scrub forest which is difficult

of transit is called "campo cerrados" or closed pasture lands. Patches of the Sao Francisco valley and some uplands inland of Salvador carry a very dense thorny scrub with a specialised range of deciduous thorn bush species, which is termed "caatinga"; the territory to the north of the accompanying map carries large areas of caatinga vegetation. Most of the watercourses in the campo carry a ribbon of dense forest along the river banks, even where the surroundings are little else but grassland, just as described in "Brazilian Adventure".

Both on the mata-clothed slopes open to the Atlantic winds and in the campos cerrados, much shifting agriculture is practised by burning off the natural vegetation, taking a few crops and then abandoning the locality in favour of burning off a new patch elsewhere. North of Bahia the drier caatinga territory suffers from a most unreliable rainfall and whole regions are frequently devastated by droughts - or sometimes by floods - causing wholesale widespread shifts of population. Some of the population of this mapped area of Minas Gerais and Bahia are consequently always on the move, just as Mhr. Buining observes in his account of his trip.

Although the friagem winds flow into the upper Amazon basin well to the west of this map and north of Salvador at the east, the very altitude of the highlands keeps them virtually outside the immediate influence of these cool winds. The sudden falls of temperature which these winds bring to Argentina, the Chaco and the Matto Grosso and southernmost Brazil do not occur here; being in tropical latitudes there are no night frosts and the annual temperature range (as can be seen from the above table) is small - indeed the diurnal variation will be in excess of the annual daytime temperature variation.

Those cacti which grow in the thorn scrub and caatinga in this area will often be found on poorer sandy soils. They will thus enjoy not only a well drained soil, but also a warmer and more equable climate than most other South American cacti, free from the immediate effects of friagem winds. It is for these reasons that the cacti from this area are not as tolerant of the vagaries of cultivation as are most other South American cacti. They would obviously prefer a steady sort of warmness to which they are accustomed in habitat, before they could be expected to respond with steady growth in cultivation.

The Melocacti which are fairly widespread over this area are well known for their preference for warmth; also on this map is the Serra do Cipo, referred to by Horst in the accompanying article, the type locality of Cipocereus. The map also shows the Morro de Chapeau and the Serra de Sincora to which Mhr. Buining refers in his account of his collecting trip, and the Serra Negra recorded in the N.C.& S.S. Jnl 23.1:68 as the habitat of Uebelmannia buiningii. Several locations for Coleocephalocereus (Chileans No.21) also appear on this map - Guanambi, Caetite, Serra das Almas and Livramento.

Arrojadoa, Micranthocereus, Leocereus, Austrocephalocereus, Stephanocereus and many Pilosocereus and Discocactus also grow under the equable climatic conditions of this region.

H.M.

THE LINZ BOTANIC GARDENS in 1969

A lecture by Stefan Schatzl: reported by Dr.A.Bayr.

(Translated by W.Kuegler from the G.O.K. Bulletin for January 1970).

At our first monthly meeting of the Upper Austria district, a large number of cactophiles gathered at the Botanic Gardens at Linz. Herr Stefan Schatzl was kind enough to provide us with a full evening - programme of colour slides of newly acquired plants at the Botanic Gardens and of the first flowers of earlier acquisitions.

Herr Schatzl was able to report that during 1969 many new acquisitions had been made of plants hitherto not represented; the largest part was the "harvest" of his journey to Frankfurt, Heidelburg and Munich, the remainder comprising consignments which came from Frau Muhr of Argentina, from Africa and Asia and through exchange with friends in Austria. In this way many

plants found their way into the collection of the Botanic Gardens: 104 different orchids, both leaf orchids and leafless orchids, the latter having roots containing chlorophyll which take care of assimilation: 74 Bromeliads including 53 species of Tillandsia: and 115 species of cacti, chiefly progeny of imports of the genus Lobivia, Rebutia, Aylostera, Sulcorebutia, Frailea and Gymnocalycium; and finally 43 species of the genus Conophytum. Truly a valuable and tremendous increase !

It is not necessary to reiterate how well Herr Schatzl understands the photography of the plants and their flowers; the colour slides we were shown were not only an instructive reference for the participants of the monthly meeting but also a true delight for one's eyes. Herr Schatzl showed us the following plants:

Arrojadoa penicillata, an imported plant from Bahia in Brazil; it is a most interesting cephalium bearing plant which pushes its new growth through the old cephalium at the new growing season, and then forms a new cephalium higher up the stem, giving the appearance of so-called ring cephaliums along the cereoid body. This species was described in 1909 by Prof.Gurke as Cereus penicillatus; Prof.Werdermann classed it as Cephalocereus in 1933, whereas Britton and Rose established the genus Arrojadoa in 1920.

Arrojadoa rhodantha, similar to the foregoing, was also described by Gurke in 1909 and comes from Brazil (Bahia-Pernambuco).

Arrojadoa sp. HU 154 (A.gigantea) was imported from Brazil by Uebelmann, also Arrojadoa sp. HU 216 (A.cafaurnuersis).

Last year Submatucana paucicostata Backbg and Submatucana intertexta Backbg both from Peru, were flowering for the first time.

Visited and pollinated by humming birds are Cleistocactus brookei Card. and Bolivicereus samaipatanus Card.; both are found around Santa Cruz in Bolivia. On the other hand, Pilosocereus houlletii is visited and pollinated by bats; although their flowers exude an unpleasant smell for the human nose, bats are evidently allured by it.

Of bromeliads, Herr Schatzl showed us the diverse, very interesting, pretty and easy to cultivate genus of Tillandsia. Tillandsia aeranthus from Peru and Brazil; T.geminiflora from Brazil; T.unca from Argentina - a plant which does not inhabit trees as customary, but grows on soil and on rocks; T.mauriana and T.ionantha from Mexico; T.funckiana (T.andreana) from Colombia; T.crocata form from Argentina; T.argentea from Mexico; T.gilliensii from Argentina-Bolivia; T.pairanoi from Argentina; T.streptocarpa and cachicola from Argentine-Peru; and T.xiphoides which is spread over Argentina, Bolivia, and Uruguay. The Linz Botanical Garden has, over the years, become one of the most diverse gardens for Tillandsias.

CLEISTOCACTUS LEM. - Three examples by Raimund Czorny

(Translated by E.W.Bentley from K.u.a.S. 19.7: 1968)

None of the three Cleistocacti considered here are longer than 90 cm and yet they already flower freely. It is surprising how seldom representatives of this handsome genus are to be met with in our collections. Shortage of space can scarcely be the sole reason for this.

I will try to arouse the interest of the cactus enthusiast in these beautiful plants and present three species that cannot claim to be rarities. On the contrary, they are quite ordinary representatives of their genus but are no less beautiful or prolific on that account.

I keep my Cleistocacti freely planted out in a cereus bed in my greenhouse. They get sun all day. I do not economise on watering or even on fertilisers.

Cleistocactus strausii (Heese) Backeberg

Who does not know this striking white-spined species? The multistorey-like flower zones are noteworthy. The characteristic flowers stand out from these zones in a dense crowd. The

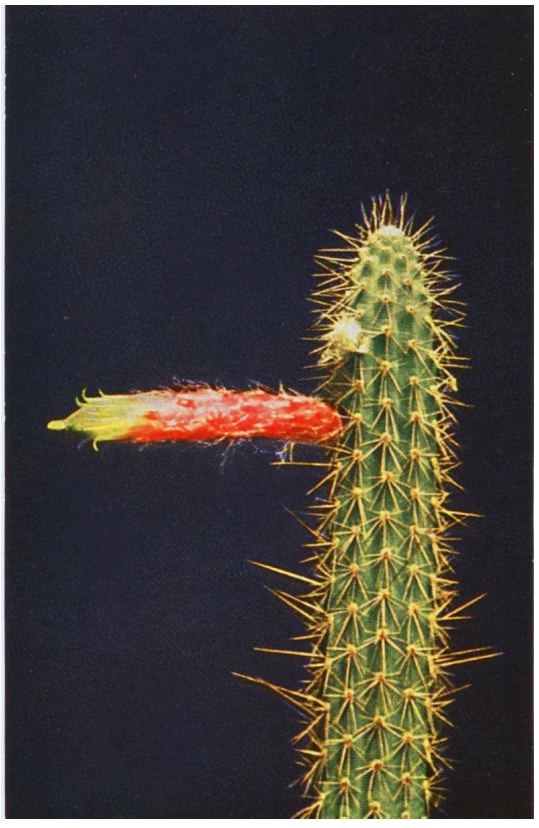
flowers are 8-9 cm long, straight, narrow (diameter about 1 cm.), wine red, hairy and with the style bearing the stigma projecting well out.

Cleistocactus flavispinus (K.Sch. non S.D.) Backbg.

In this plant also the fine flowers occur in "storeys"but in contrast to C.straussii are not so densely crowded. In length 4.5 cm, diameter 6-10 mm, lightly hairy, gently curved. They have an oblique rim which gives them a particularly characteristic effect. In addition the outer perianth leaves are light red to orange and the inner ones are golden yellow. The stamens project from the flower opening in a bundle and from their midst projects - at the stage of full flowering - the stigma lobes. This species has reached a height of 75 cm for me.

Cleistocactus smaragdiflorus (Weber) Br. & R.

"Smaragdiflorus" means flowering emerald green. This description refers to the green-coloured flower rim which clasps the likewise green stigma lobes. The peculiarity that the flower remains firmly shut gives the genus its name. The other part of the flower is a shining red - length 5 cm, diameter 1 cm. The flower hairs can be clearly seen when viewing the flower against the light. Like C.flavispinus, this species flowers profusely all through the summer. Also very attractive are the seed-containing berries produced without external assistance. They are white-haired and a shining red in colour. This species, in contrast to the other two, does not grow upright but instead - according to its situation - lying down or overhanging. It can be recommended to all cactus enthusiasts, including beginners, by reason of the facts that already at a size of 25 cm it is ready to flower, through its self-fertilising capacity it produces seed freely and it is evidently suitable as a propagating stock (for this see the article by Tauber in K.u.a.S. No.2 1967).



Cleistocactus
smaragdiflorus
Buxbaum - Krainz
Die Kakteen

As regards culture, Cleistocacti make no special demands; they need an open, very nutritious soil; in the growing season a sunny place and therefore planty of water. Thus it is recommended to plant them out if possible. In winter they withstand light frosts in dry conditions. If anyone likes to grow a Cleistocactus but cannot plant it out, he should not be put off by this. An extra large pot will do instead for these easily satisfied plants.

Comments from H.Middleditch.

"I have a feeling that the accompanying colour print depicting Cleistocactus smaragdiflorus has lost the green tinge from the tips of the petals at the mouth of the flower, in the course of reproduction. Britton and Rose describe the flower as having "perianth segments ... green". In his Die Cactaceae, Backeberg describes the flower as having a red tube and "green fringe".

CEREI FOR THE WINDOW SILL: THE GENUS CLEISTOCACTUS by Peter Klenk.

(Translated by E.W.Bentley from K.u.a.S. for December 1971)

When Lemaire set up the genus Cleistocactus in 1861 for Cereus baumannii he certainly could not foresee the size that this genus would assume. In Backeberg's Cactaceae in 1959 already 31 species were listed; in his Kakteenlexikon the number climbs to 50 species. To these can be added 20 species, still undescribed, for the discovery of which we can thank mainly Ritter and Cardenas.

This genus of cerei of comparatively modest height comes from South America, where its distribution stretches from mid-Peru over eastern Bolivia to north Argentina. Remarkable is the difference in altitude over which Cleistocacti occur; from some 500 m in Uruguay and Paraguay to over 3,000 m up in Bolivia.

In cactus collections one comes across more and more truly undemanding, well-growing and for the most part easy and early flowering plants. Because of the numerous species that reach only 1 m in height and on which one can already expect flowers at a height of 20 cms they are also recommended for the window-sill grower. Here can be named particularly Cleistocactus azerensis, baumannii, brookei, chacoanus, parapetiensis, rojai, smaragdiflorus and villamontesii. The variable spination and the flower colours - white, yellow, orange, red, green - make the genus especially attractive.

I took up this genus six years ago and now over 50 different species are in my collection. In spite of the widespread idea that one can only keep cerei in the greenhouse, I grow them in the open air from April to November - protected against the rain of course. They have even been unaffected by short frosts in spring. I grow the plants in large plastic pots as I have no possibility of planting them out. For this reason and because of the hard growing in the fresh air naturally not such quick growth is attained as in the greenhouse. One is compensated for this by the numerous flowers that appear and the especially thick spination on relatively small plants. The plants are over-wintered in the cellar at about 10°C and with Osram Fluora lighting.

In order to flower well they need an open, very nutritious soil and in the growing period a sunny place, copious watering and feeding. Also in winter they should not be completely dry. By this culture method I have managed to bring to flower Cleistocactus straussii at a height of 45 cm, Cleistocactus baumannii at 25 cm and Cleistocactus smaragdiflorus at 15 cm.

Cleistocactus jujuyensis (Backbg) Backbg.

Already at a growth height of some 80 cm there appears in the upper third of the plant (which is often confused with C. straussii) the numerous 4 cm long carmine red flowers. The easily sprouting plant makes fine groups with 4 - 6 cm thick branches with about 20 narrow ribs that are almost covered by the 20 to 30 pale spines at each areole. Habitat - Jujuy Province, north Argentina.

Cleistocactus parapetiensis. This plant reaches a height of 60 cm and a diameter of 4 cm, covered by over 20 whitish spines, up to 1 cm long, at each areole. Already at a height of about 20 cms it produces red flowers with a green margin, the whole summer through.

Cleistocactus chacoanus. This 8-ribbed plant belongs to the C.baumannii group; perhaps it is only a variety of it. At each areole there are 12-15 outer spines about 1 cm long and 1-2 centrals 3 cm long, brown to almost black. The flower resembles very much that of C.baumannii but is however, not so strongly bent and therefore more zygomorphic. The tube is light red with isolated scales and small hairs. The petals are yellow-orange with a darker middle stripe. The anthers are violet, the style with 5 yellowish stigma lobes projecting from the flower.

Comments on flowering Cleistocacti

... from R.W.Field, Australia

"As I write this in October - our second month of Spring - the plants in the open garden are starting to make a show. Some of the Cleistocacti are already covered in buds with C.strausii always ahead of the others and in bloom already. This species forms buds in mid-winter and the buds do not mind our frosts - often 20 to 30 in a row and down to 24°F on the ground, usually followed by sunny days with shade temperatures of 60 to 70°F".

... from Mrs M.Leach

"I have a plant of C.smaragdiflorus which was grown from seed by a fellow member of the Crawley branch in 1966 or 67. Speaking from memory only I would say that it first flowered in 1969, in November, on that season's growth. It is still solitary, about 52 cm long, curving over like a shepherd's crook after about 30 cm but still fairly rigid and does not need staking. Diameter about 1.5 cm, slightly thicker at the base, tapering towards the growing point, 11 ribs. It flowers each year now between June and November, the flowers being spread over several season's growth.

"Looking at the plant in March 1972 I see that there are 28 aborted buds between the 22 and 50 cm levels and a fruit from the last of last season's flowers - it always sets fruit each year. The top 2 cm of the stem is quite bright and fluffy and I would guess that it has continued to grow slowly during the winter, but I have not observed so farefully as to be sure. Despite its small diameter the plant is in a mixture of John Innes No.2 and sand, about 50/50 by volume.

"I seem to remember reading somewhere about a hybrid of which one parent was C.smaragdiflorus, which included the comment that the hybrid had "inherited the free-flowering characteristic of this parent". I would have thought this must be in the N.C.& S.S Journal but I cannot find anything in the index to help me identify the article. However, I did find an article by E & B.M.Lamb in the N.C.& S.S.Journal 1963 p.43 which says "... about eight specimens, each with three or four stems, have been flowering for the last 2 or 3 years, yet they are only six years' old from seed".

"The flower shown on the colour print is much as I remember mine to have been, though I would not think they were as long as 5 cm as Backeberg gives in the Kakteenlexikon - more like 3.0 or 3.5 cm. Also, my plant is much closer spined, especially towards the growing point. One is hardly aware of the green flesh, as the impression gained is of a light straw colour from the many radial spines. The centrals, although irregular in position and spacing, are much more pronounced and rather more prolific than in the print. They are usually at a more acute angle to the body, pointing towards the crown".

... from V.Corbett

"I have a plant of Cleistocactus straussii v. jujuyensis which I purchased from Woolworth's in the 1930's for the magnificent sum of sixpence. It stood in the greenhouse for $5\frac{1}{2}$ years whilst I was away at the war without any winter heating at all. Since then it has gained in strength

to produce eleven arms, three of which bear flowers, the longest arm being 36" high. One of the other arms suffered from the 'stopping' to which you refer, but in my case this was a complete withering of the top three or four inches. I would imagine that this has something to do with the watering, particularly as my plant was in a clay pot at the time. Since then owing to the size of the plant I have been obliged to put it into a plastic bucket which appears to suit it very well. It is now due for another repot - although it is in flower at the moment (April). It does seem true that the flowers come in layers or storeys.

"At the other end of the scale I have a single stem of C.smaragdiflorus which I grew from seed, which flowered when it reached a height of 2" (two inches).

... from H.Smith

"I bought a plant of Cleistocactus smaragdiflorus in December 1968 for half a crown - it was quite a small plant, in a $2\frac{1}{2}$ inch pot and I regret to say that it stayed there until Spring 1970 when I put it into a 3" pot. Repotting revealed it to be seed grown - not a cutting. It flowered for the first time in 1970 - there were two flowers and again two on different arms in 1971. A tuft of white bristle has just appeared at one areole suggesting another bud forming for 1972 (this on April 1st). The plant has been repotted each year, the last time into a 5" square pot. It now has five arms, the longest being $6\frac{1}{2}$".

"Stopping at the growing points during the winter is a problem but it does not always affect all the arms. Those affected do not seem to grow again but new arms are produced from the base in the next growing season. Three of the five arms on my plant are stopped.

"The growth of the flower is interesting to see. For weeks there is nothing but a tuft of white bristle then quite suddenly the tube begins to grow out and it gets longer and longer every day for several days. When the tube has achieved maximum length, the tips of the green petals turn back and the stigmas protrude.

"In each of the two years when there were two flowers, the second did not open until the first had begun to die back. In each year the fruit produced by the first flower split vertically and the pulp containing the hard black seeds was exuded. In both years a blue mould developed on the pulp and I then removed that fruit. In each year the fruit produced by the second flower did not split. It remained on the plant all winter and early in the next year it dried up.

"I read somewhere, but I cannot recall where, that C.smaragdiflorus can be used as a grafting stock. I put in some seed in March '71 hoping to get some good seedlings for use as grafting stock, but this did not materialise because the C.smaragdiflorus seedlings have grown so slowly - maximum height after about a year's growth is only half an inch.

"My other Cleistocactus seedlings have done much better than this. C.candelilla is now $10\frac{1}{2}$" high, C.flavispinus is 14" high, both 1967 sowings; C.flavispinus now requires a stake to prevent it from sprawling. C.aureispinus, sown in 1968, is nearly 12" high and Cleistocactus jujuyensis sown in spring 1969 is 9" high.

"All these plants seem to need a rich compost, plenty of root room which means frequent repotting, and plenty of water in hot weather. (That comment without prior sight of the German article - H.M.) I have not tried to keep mine growing in the winter".

... from P.C.G.Bourdoux

"In my preceding collection I had a number of Cleistocacti grown in large pots with normal cactus soil. Some of them were big enough to flower but never did so. When I moved to my present abode I was only able to erect one greenhouse (in place of three before) so I decided to plant some of my Cleistocacti in the ground at the back of my lean-to greenhouse, so as to cover up the concrete wall. The natural soil was heavy clay and I turned this over with a fork, mixing in river sand and a little peat and leafmould into the top layer to help the plants to root. As always, I cut off most of the roots, leaving only some big roots which I reduced to about 5 cm

in length. After leaving the plants lying outside a few days to callous over, I planted them against the wall where they became quickly established for I did not observe any change in growth. However, they did begin to grow quite fast, so much so that I was obliged to take some out and give them to other collectors. After two or three years, following the move, they all produced a lot of flowers. I have still kept C.baumannii which flowers from April to November - hundreds a year; C.jujuyensis; C.smaragdiflorus; C.candelilla which is the only one never to have flowered; C.bruneispinus about 7 cm thick - a young cutting planted two years ago; C. tominensis and C.tupizensis.

"I suppose that a free root run in heavy soil and freedom to extend the roots in all directions were the "flowering agents". There are so many flowers that I have to collect the fallen blooms from time to time off my echinocereae. I will also add that they are all planted in the coolest corner of the greenhouse - far away from the heating during the winter, the warmer places being kept for other sorts".

... from H.Middleditch

"I feel that I have been fortunate in seeing flowers on four different Cleistocacti in my collection; I am still in the process of trying to track down a name for three of them using the shape and colour of the flowers as a guide. My really big problem, however, is the "stopping" of the growing point on ever so many of my Cleistocacti which completely spoils their appearance and sadly hinders their growth. Most of the stems do eventually manage to restart into growth, obviously after a struggle, if they are up to about twelve inches or so in height; but when the tall stems get stopped they seem to give up the struggle and leave it to the new branches to carry on.

"It must be some years ago now that I started to give these plants some water in the winter, more by accident than by design in the very first place. However, they did seem to take to this treatment and now I try to give a trickle of water at intervals throughout the winter. When they are growing well, a stem can put on more than six inches of growth from early autumn to late spring. Quite often one can discern in about the middle of this growth a change - be it ever so local - either in spination or epidermis colour - where there was a slight hesitation in the growth in the very depths of winter. There is practically no growth in midsummer in the months when their homeland has the least monthly rainfall. I am not really sure whether I might be able to get over the "stopping" of the growing point if I could manage to keep a plant actually growing - be it ever so slowly - all the way through the winter. Perhaps if I put those plants which are in "neat" sized pots into larger pots it might help.

"I have a feeling that there is a fair range of variation amongst the flowers of the Cleistocacti, not only in colouration, but also in shape and in hairiness. If this tied in at all with geographical distribution and body characteristics I might have a chance of getting a few more names on my Cleistocacti".

... from R.Ginns

"I have quite a large collection of Cleistocacti species, with C.tupizensis 5 feet high and so downwards to 3". Flowering size varies considerably with the species. C.wendlandiorum, like strausii only very pale yellow spines instead of white, flowered first at 6" tall. Others that have flowered, mostly in 6" pots or possibly 5" size, are C.anguinus, baumannii, candelilla, colubrinus, and strausii. The largest plants - tarijensis, tupizensis and tupizensis v. sucrensis have not yet flowered.

"I have not noticed the 'flower zones' mentioned on strausii. The flowers on my plant appear at random".

There are slides of G.strausii and C.smaragdiflorus in flower in the slide library. Slides of other species of Cleistocacti in flower will be very welcome - A.W.C.

HUNTING FOR CACTI IN BRAZIL by Leopoldo Horst

(Translated from K.u.a.S. 22 (12), 1971 by E.W.Bentley)

Even by South American standards Brazil is a giant land. Almost as big as Europe, it is associated by many with endless tropical forests, giant rivers and waterfalls, coffee plantations, sugar-loaf and Rio de Janeiro.

That it also includes dry regions of enormous extent is all too easily forgotten. In short, Brazil is as a result also a cactus country and the home of many old and new species familiar to cactus enthusiasts. And so, as a cactus collector, I am content to stay there.

My present day, professional, very close love affair with these plants goes back to my childhood. When still a youngster I loved and wondered at the leaf-cacti and their wonderful flowers. I grafted them on Hylocerei as a result of which they grew even stronger and I possess even today a number of Mammillarias and Astrophytums and an Echinocactus grusonii that I acquired over 30 years ago. But then my professional activities took another direction.

In the years 1958/9 on tour through rocky mountainous country in the State of Rio Grande do Sul in the employ of a construction firm I had the opportunity to study the cactus flora along the road. In 1960 as the representative of a factory in the Serra Geral I travelled in my own truck through a mountainous zone of Rio Grande do Sul. I used the free weekends for climbing tours in the cactus zone with friends. These undertakings brought my first collecting results. I found Notocactus (Eriocactus) claviceps later described by Herr Ritter, Notocactus horstii, as well as Notocactus crassigibbus, N.arachnites, N.scopa varieties, Frailea horstii and varieties of already known species of the genus Frailea, Wigginsia and Gymnocalycium. These cacti have partly been described by Buining and are partly in course of being published by Ritter.

In 1962 I came into association with Herr Haage of Erfurt. As a return for the seeds that I sent him, he sent me books on cacti, the study of which first really stimulated me to collect. I sent some of my finds to Herr Buining in Holland who equally in his first letters to me drew my attention to interesting cacti in the State of Minas Gerais and also to the then little known Parodia gummifera that Dr. Mello Barreto had found.

In the years 1963 and 1964 Herr Ritter from Chile twice visited me. We made several short raids through Rio Grande do Sul and as a result found new species and varieties of Notocacti.

From that time I aspired to undertake a long journey to Minas Gerais and Bahia. This wish was realised in the year 1965. On 8th January, with my friend Dr. Gastao Baumhardt, an ardent orchid collector, I started out in North-east Brazil, and I will describe some episodes of that journey in the sequel to this article.

We drove through the States of Santa Catarina and Parana to Sao Paulo and then beyond Belo Horizonte to Minas Gerais where, in the Serra de Cipo, we collected Pilocereus aurisetus. From there we went north into the Serra Geral district. Day after day we searched there for cacti, unfortunately without much success. Then one day I asked an inhabitant, a young negro, about cacti. When he finally understood what we wanted he explained to us that up in the mountain range there was a "Quiabo da lapa" which one could translate as "somewhat turnip-like". He also drew a comparison with a pineapple with spines and that sufficed for us to set out thither the next morning. In the company of our informant and provided with ruck-sacks and reed baskets we climbed the mountain by way of narrow footpaths. It was quite a strain but our sudorific expedition was rewarded! On the plateau we found a beautiful Astrophytum-like plant of which up till then the cactus world had no knowledge. The sensational new discovery was later described by Buining as Uebelmannia pectinifera. Here in its habitat - as so often happens - unfortunately, fire had raged and many of the plants stood only as dry shells. On the rather dangerous leached quartz-sandstone rocks the search now began. We piled good specimens together in a heap and packed them all in our baskets between sparse grass that we had found, and on this occasion joyfully carried these down to the valley. The reward for the negro youth, reflecting our high spirits, turned out to be liberal!

Our particular object however was the site of Uebelmannia gummifera of today, which at that time was still accepted as a Parodia. In the locality indicated to us, by a small village, we again took along an inhabitant with a knowledge of the district. We had to complete the last 6 Km. up to the mountain chain on foot by difficult tracks. Shortly before the ascent we were at a large 'fazenda' as guests of the owner, a black family. We were greeted with a most friendly welcome and invited to drink the usual 'Cafezinho'. As a small counter-gift we shared out 'Caramelos' among the numerous children, for which we were thanked in a most polite and well-mannered way. When we explained in the course of conversation with the man what we were looking for, he immediately announced that similar plants were to be found on the quartz-sand mountain slopes. Obviously he regarded us as half-cracked and could not comprehend that this cactus collecting could be the motive for a journey of thousands of kilometres. However he had become curious and after a further half-hour of talk he set himself up as the expedition leader and put at our disposal a little donkey as transport. We climbed then in a body the mountain range built of pure white quartzite that was covered only thinly with bushes, in whose shade the "Parodia" gummifera actually grew. As it later turned out we were not dealing with the looked for species, but with another representative of the genus, since described by Buining as Uebelmannia meninensis. Now, the collected plants were temporarily packed again in reed baskets and loaded on the donkey. Slowly the little caravan moved down the mountain to the fazenda. There the wife had prepared us a meal of beans and mandioc flour, rice, a piece of dried meat and vegetables consisting of green cucurbits. As guests we had each a knife, fork and plate but the host fed himself with his fingers from an earthenware bowl. A pair of dogs under the table completed the idyll and I must say that the meal tasted to us as rarely meals do. After we had got our strength back we had to set out with the heavily laden donkey on the six kilometre march to the auto - at the end of which the little donkey, totally worn out, could scarcely stand any longer on its legs.

On the next morning we had a nasty surprise: as we unpacked our treasures we found that many of the plants had lost almost all their spines in the course of the difficult transport. As a result we packed everything carefully this time in newspaper and paste-board cartons and set out on the return journey with the truck filled to bursting.

After an adventurous drive during which we made more expeditions to cactus habitats, good friends and sights of the country, we returned home happily and, in spite of all exertions, in good health. What we had lost in pounds in the 36 days was adequately compensated for by our impressions of the journey and our joy over the new discoveries.

WHAT IS A CEPHALIUM - PART 4 by Prof.F.Buxbaum

(Translated by K.Wood-Allum from K.u.a.S. 15.3.64) (Continued from Chileans No.21 pp.70-74)

It is from the very first flowers on a plant that you can recognise that the cephalium is a product of the cauline zone. The first flower of Cephalocereus houlletianus is simply surrounded by a thick woolly wreath. A similar single woolly tuft is formed on Espostoa x Haageocereus, the hybrids described as Neobinghamia, as a result of the formation of wool in the cauline zone where flowers develop. This is inherited from Espostoa.

Again this reminds one of a phenomenon which can be observed in Espostoa guentheri. As is the case with most columnar cacti, when a young plant is nearing flowering age, odd blooms start to develop, individual areoles take on the characteristics of the podaria of the cephalium; at first there are only a few, then more and more develop long hairs, until finally each areole on one side produces a bud and is included in the cephalium. As flowering capacity increases, more and more ribs are included in the flowering zone. At first the cephalium is one sided but gradually all the ribs are drawn into the cephalium and this then slowly covers the whole of the head of the plant. Cephalocereus senilis falls into this category, and more strikingly so, Mitrocereus militaris, whose cephalium was compared by Schumann to the fur caps of Bavarian Dragoons.

In the case of a young Espostoa guentheri you may see around the zone where the first signs of flowering occur a clear periodicity which is not evident in a fully formed cephalium. This means that at first flowers are only formed at particularly suitable times. This explains the form of cephalium which develops periodically, interrupted by intervals of vegetative growth, as in Cephalocereus apicicephalium. Whether this periodicity is an annual occurrence or whether longer flowerless periods alternate with a very rich development of flowers, as for example in the case of the common beech, has not yet been examined. At any rate it is a case of periodicity between the times of strong growth and times of very limited growth when the flowers are formed. In the case of very slow-growing varieties such periodicity does not occur or is not easily recognisable.

These occurrences demonstrate a fundamental and important fact. The position of the flowers is not dependent on the form of the cephalium, the opposite applies, the form of the cephalium depends on the position of the flowers.

With many cacti the position of the flowers is distinctly light-orientated. This is unmistakably the case with those columnar cacti whose cephalium develops to one side. Goebel indicates, for example, in his description of a true cephalium (which was the first and for a long time the only useful description) on a cephalocereus (he gave no indication of its species, merely that it came from Brazil), that one-sided cephalia should always be north-facing. Whether this orientation is due only to light or whether also to temperature has yet to be studied and any such study would have to be carried out in habitat. With genera which lack what we shall call habitat-conditioned orientation of flower formation, the flowers can develop around the crown of the plant right from the beginning and a crown cephalium develops (e.g. Morawetzia) which can be grown through again and again owing to the periodicity in the growth of the plant, as in Cephalocereus apicicephalium or Arrojadoa. Incidentally, and this is little known, side-growing cephalia can be interrupted. In the plant examined by Goebel two cephalia on the plant were separated by an eighteen inch gap.

All other cephalia, or cephaloid flowering zones are in principle the same as the type described in this article, since they are all developed from the cauline zone of the flowers. With this we arrive at an answer to the third question. As the broad distribution of a more or less hirsute cauline zone leads one to suspect and the different flower formation found in cephalium producing plants proves, the development of a cephaloid flowering zone is the expression of a development tendency which is inherent in practically all of the subfamily Cereoideae and it can exhibit itself in the greatest variety of lines of development. It is therefore completely erroneous to interpret the cephalium as the expression of a closer relationship and to unify all cephalium-bearing plants in a related group.

It is also erroneous to make a fundamental distinction between a pseudocephalium and a true cephalium. Morphologically they are both the same and we should not talk of "gutter" or "split" cephalia, which are no different to a typical true cephalium. Such misnomers arose from scanty study and poor basic morphological knowledge. Whilst the fact that in the true cephalium the flower buds develop first doubtless constitutes an advance compared with the later development of flowers in the pseudocephalium, it would be wrong to see in this fact alone the expression of a significant higher general development of a distinction between genera.

Within the genus Cephalocereus, C.senilis for example, which in its flower formation is the most primitive, has a true cephalium, while others which in their flower formation are much higher, bear a pseudocephalium. Whilst doubtless very highly evolved cactus genera display no sign of cephaloid formation, we have to recognise in the peculiar arrangement of the flowers of Neoabbottia a typical true cephalium, yet Neoabbottia is without doubt a very primitive genus.

But it is possible that the cephalium has a very important biological function. Herr Schwab, Director of the Cactus section of the Huntingdon Botanical Gardens in San Marino, California, told me that the flowers of Cephalocereus senilis in the collection used to abort. If at the appropriate time of year the cephalium is sprayed with water however, the flowers open a fortnight later.

Comments on "What is a cephalium?"

... from K.Wood-Allum.

"Of all the German translations I have tackled this one was by far the most difficult, especially on account of the complexity of the botany. I should like to acknowledge the assistance given in the preparation of this translation by B.Fearn B.Sc., F.R.H.S.

"I am interested to see the suggestion that side cephalia should always be north-facing. As the species concerned in that comment came from Brazil, presumably a side cephalium should be south-facing in the northern hemisphere?"

... from H.Middleditch

"Following the last query, what happens to the poor Espostoa in Peru, which have the sun to the south of them in their summer and to the north in winter?

"Any cephalium-bearing plants will be welcome at the 1972 National Gathering".

NOTOCACTUS SEEDS IN CLOSE-UP by D.J.Lewis

Recently the classification of the Notocactus group has been discussed in the Chileans and in order to back up the findings of the people concerned the seed was also studied in detail and, in the main, found to tally with the sub-groups formed in the classification.

Various seeds have been drawn to show the side view giving the shape of the testa and cell structure, with the width in some cases of the hilum rim. The plan view shows the layout of the various parts of the hilum. The funicle appendage (the raised central stump) and the micropyle (either raised or depressed) is also shown.

If one looks at seed under a microscope it will be seen that no two look exactly the same, but within each species there are characters that stand out. Where it is considered that a plant belongs to a certain sub-group, these characters may be looked for and are usually found, although, maybe in a modified form. Somewhere along the line these modifications are so extreme that one tends to consider the seed as belonging to another sub-group, or at least another species. It is then that a cross-check with other plant characters is very necessary, and is why classification requires to take in all available plant characters (i.e. plant body, spines, floral parts and the seed) and then make a formulation from the findings.

Notocactus ottonis. With its varieties and forms it makes up the most sizeable sub-group in the Notocactus. Many of the varieties or forms have similar seed and in fact many plants have been reduced to synonymy.

Notocactus scopa. This plant falls within the ottonis group but has a smaller seed and a slightly elongated testa cell. The micropyle opening happens to have more of an appendage than the funicle.

Notocactus apricus. At first glance this seed looks very similar to ottonis but it is in fact a more symmetrical seed with a large centrally placed funicle cone. Close to N.apricus we have N.concinnus and its v. joadii. N.caespitosus also falls within this group of seeds.

Notocactus leninghausii and its close relatives N.schumanniaus and magnificus are the cause of much head scratching as the seeds and the plants themselves hardly come within the scope of the Notocactinae group as we know it now. The seed is reddish brown and the testa cells are very elongated. The frilled hilum rim is also an odd character and is most prominent on N.leninghausii.

Notocactus crassigibbus. Another seed that causes problems, as it seems on first acquaintance to be quite distinctive. The testa is covered by a layer of cellular material similar to

mammulosus and the hilum pattern is also similar, yet the flower and body characteristics resemble the apricus sub-group. Other plants in this group are N.arachnites and N.uebelmannianus.

Wigginsia (Malacocarpus) species create few problems as the seed pattern is very similar in each species. This is not surprising as it has been proposed that many species are reduced to synonymy. There is a wide difference in the size of the seed in a species. The testa patterning is caused by a layer of cells overlying the testa in the ripening seed pod and becoming dehydrated on eventual seed dispersal. The hilum area is characterised by the bulbous knob which is apparent on most seeds, but tends to vary in size even within a single pod of seed.

Notocactus mammulosus. A seed that would appeal to an artist, being well proportioned and with good lines. The testa is again covered with an extra skin through which the testa appears in small ruptures. The overall colour is light brown. The hilum base is recessed within the curved hilum rim. The micropyle is further recessed in a half moon shaped basin.

Notocactus rutilans. Closely related to the above plant but seedwise showing some tendency towards the Wigginsia group. The testa covering is usually patchy but may envelope the whole testa giving a mid-brown coloration to the seed. The shape of the testa is more squat and the basal outline tends to be squarish. There is no recess in the hilum and no marked funicular or micropylar opening.

Notocactus haselbergii. Another group that does not fit into Notocactus in all its aspects. The plants in this group have red (N.haselbergii) and green (N.graesnerii) flowers. Seedwise the plants are very similar - the size of the funicular cone is all that tells the two species apart. The feature of an angled hilum base is shared with the brevihamata/buenekeri complex, which are also Brazilian plants. With the latter, the testa shape is shorter and wider and with an uneven surface.

Although seeds are so small, they do form a static reference system unaffected by wilting as in a flower, or the system of cultivation we or nature chooses for the plants. We should, therefore, be influenced by them in our attempts at classification.

Comments on Notocactus seeds

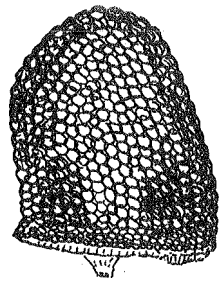
... from G.J.Swales.

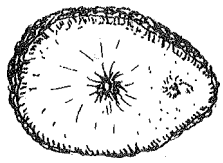
"Although the final paragraph of David Lewis's article is brief, nevertheless I feel that it does make an important point regarding the value of using seeds as a contribution towards identifying and classifying our plants.

"Having had occasion to look fairly frequently at various Gymnocalycium seed, I find that familiarity with the colour, size, and shape of the seed enables me to place the parent plant within the compass of a pretty small number of species - or often to identify it as a hybrid. Because of this very familiarity, I tend to look at a seed as a whole and so I might even find some difficulty in explaining to another collector precisely what feature or features lead me to be so certain about the naming of some seed.

"While I am fairly familiar with Gymnocalycium seed I have not had much opportunity to examine seed of other genera. However, at first glance I was struck by the appearance of the seed of Notocactus crassigibbus which bears a remarkable likeness to certain Gymnocalycium seed. This I find especially interesting in view of the general appearance of this plant also having a close affinity with that of some Gymnocalyciums.

"In looking at Gymnocalycium seed, I have so far found nothing to suggest that one seed group grades almost imperceptibly into another. The various groups or sections may be pretty clearly divided one from the other. It will be interesting to see if the same can be said for other genera such as Notocacti, but in order to do this it is desirable to examine as many examples as possible of each species from different sources".





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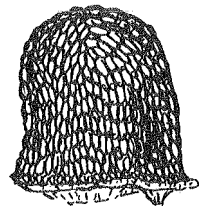
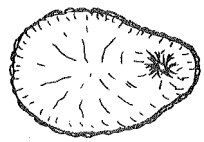
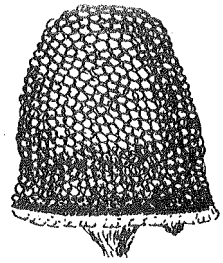
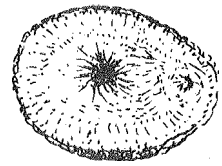


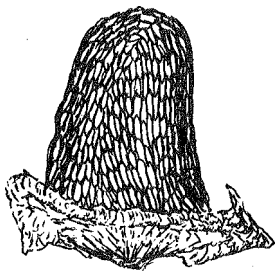


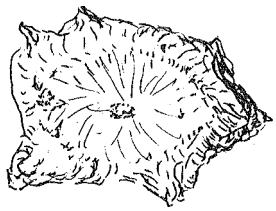
N. SCOPA



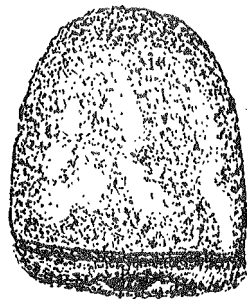


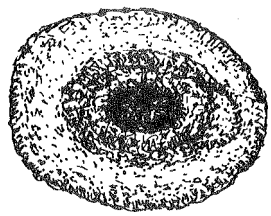
N. APRICUS



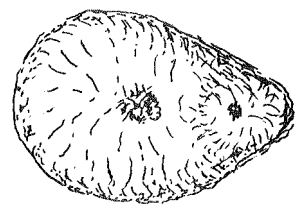


N. LENINGHAUSII

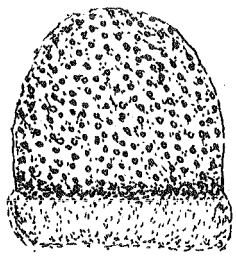


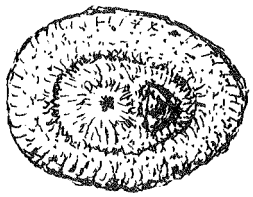


N. CRASSIGIBBUS

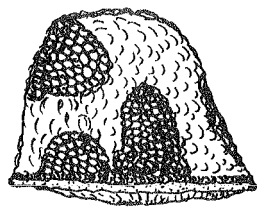


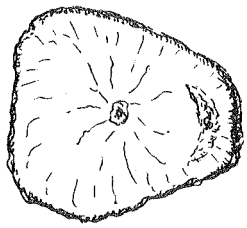
WIGGINSIA
VORWERKIANA



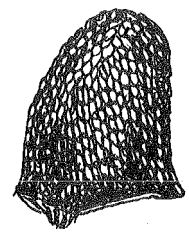


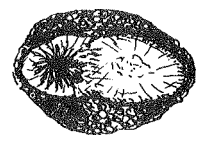
N. MAMMULOSUS





N. RUTILANS





N. HASELBERGII

D. J. Lewis SEEDS of the GENUS NOTOCACTUS K. Sch.

Scale

... from H. Middleditch

"Some years ago when I first saw drawings of cactus seeds I felt that this was a rather abstruse and academic matter that did not really have much to do with an interest in collecting cacti. I also felt that it would need some highly technical laboratory apparatus to be able to see the sort of detail on actual seeds that one saw depicted on sketches.

"Now I have got to know a little bit more about cactus seeds I find that this impression is quite mistaken. Not only are some features quite obvious just by looking at seed in the palm of ones' hand, but often even before they come out of the transparent packet. So much so that where two seed groups are concerned one may even pick up the packet, sealed, and observe straight away that "well, that seed is wrongly named". It is not very long ago that I would have regarded this as an impossible conjuring trick.

"I am very pleased that David Lewis has prepared the accompanying seed sketches, for we now have this article on seeds, a review of flower structure (Chileans No.18 pp 136-142) and of fruits (Chileans No. 19 pp 231-234 & No. 21 pp 67-70). It may now be possible to assess whether all these features are complementary or conflicting. Evidence from other genera would suggest that the former is more likely. It may also be practicable to consider the new Notocactus species in terms of these three aspects and so assess just how much any one species can be distinguished from others".

GYMNOCALYCIUM MEGATAE Y ITO by Dr.Bohumil Schutz

(Translated from Kaktusy '66 by H.Middleditch).

Syn.G. tortuga n.n. Blossfeld 1937, G.tudae Y Ito 1957, G.rysanekii n.n., G.marsoneri Cat.Uhlig 1964.

The situation of our cactus hobby at present is in many ways similar to what it was before the second world war, as many of us may recall. In South America there were being discovered new kinds upon new kinds of cactus and to collectors of these the head would spin, because all these novelties lacked even a brief valid description. Every business offered novel species and if one did not have an opportunity of securing all their price lists, one lost all correlation. In specialist magazines newly discovered kinds were not written about. It looked at that time that there was even a call for returning to classical Mexican plants, which threatened to be quite lost from collections.

No wonder therefore that the majority of pre-war cactophiles paid scant attention at the time to a single page leaflet from the firm Robert Blossfeld in the year 1937, designated as a supplement to their catalogue K 370. All the same, there was an offer made of some unusually interesting sorts of seeds, amongst which was also literally the "1084 Gymnocalycium tortuga, 3 spined, black, white flowers". At Brno there lived at that time the wellknown specialist and outstanding grower Engineer Rysanek; he ordered only seeds offered by the firm Blossfeld and raised a number of seedlings. That was a most rewarding act, for afterwards these seeds were never again on offer.

According to the very brief description, these plants should have had three spines, should have been black and the flowers white. However, there were no seedlings of this sort and they differed in respect of the number of ribs and also in the spines. Instead there were different forms with five and seven spines, but not a single one however with three: the body was really dark. Engineer Rysanek was not happy with his "tortuga" for a long time. In consequence of a serious accident he had to give up collecting cacti and the plants were transferred to the nursery of Mr.Fleischer and there some grew on up to about a diameter of 150 mm. They flowered, produced seeds and the seedlings were then distributed into different collections either under the name G.tortuga or later as G.rysanekii. A valid description, however, was never established for it was not certain whether one, two, or even three species were concerned.

Now that the third part of Backeberg's monograph has appeared, I am able to read that G.tortuga is apparently merely a form of G.michoga. To those of us who knew the real G.tortuga and the real G. michoga, it was quite clear that a misunderstanding had occurred. Possibly he had got some sort of misplaced name from the Botanical Gardens at Darmstadt (this happens quite often in Botanic Gardens) where the author saw G.tortuga with a diameter of about 100 mm. At the same time this volume contained a brief (and thus distorted) reproduction of Ito's descriptions of G.megatae, tudae and onychacanthum. I was practically convinced that Ito's descriptions applied to our own G.tortuga, syn. G. rysanekii nom. prov., but precisely on account of the imprecise description it was not possible to be certain.

Only recently have I obtained fresh information, which made possible a definite solution of the whole of this problem. I have obtained (namely from A.M.Friedrich) new photographs and further information with a translation of Ito's Latin diagnosis of the plant. That everything was successful is attributable to the well-known Viennese gymnophile Herr Guenther Moser, to whom sincere thanks are due for passing on all this material for us to study.

The information imparted by A.M.Friedrich was that it was he himself who discovered G.tortuga. Its habitat is in Paraguay and it is designation No.8 on the map published in Friciana No.23. From these plants there also came seeds, which were later offered by the firm Blossfeld. From one negative which came out of the archives of Herr Friedrich, an enlargement was prepared on which is represented all of his more recent collection at Asuncion. It is possible to distinguish there hundreds of different forms of G.mihanovichii, G.denudatum and G.fleischerianum and in the back-ground some enormous, dark and flattish plants - G.tortuga.

Up till now it was supposed that the plants had been found and the seeds had been collected in habitat by Harry Blossfeld and O.Marsoner. That was a mistake: H.Blossfeld it is true never claimed that he collected in Paraguay but conveniently omits to mention either the name of the real discoverer of them or the splendid novelty. Nowadays we do know that neither H.Blossfeld nor O.Marsoner ever collected anywhere in Paraguay; it was merely on a visit to Asuncion with A.M.Friedrich from whom they purchased the whole of the collection and great quantities of seed.

In regard to the plants, part were perhaps sent to the Botanical Gardens at Berlin, the rest were exported to U.S.A. The seeds were divided into three parts: the first portion were received by the firm Blossfeld, the second portion went to Japan and the third portion again to the U.S.A. Engineer Rysanek obtained his from the firm Blossfeld and from them came all the G.tortuga not only in our country but possibly also in Europe (except of course his "tortuga" at Darmstadt, which it is said had round pointed areoles and looked like G.michoga).

The picture of Friedrich's collection, to which I have referred, is not very sharp as I received it and the quality would suffer even further by another reproduction. However, after this I was successful in enlarging a print of the next negative, in which we see our plants in their original habitat (in the middle of the state of Paraguay at V.Militar). Just as their finder must have observed them, when he discovered these mighty clumps of unknown plants. That document is immensely valuable, from it we can study the appreciable variability of the species. There are forms with different numbers of ribs, with five and seven spines, solitary forms and offsetting ones (seedlings grown by Engineer Rysanek indicate the same variability). By means of these illustrations is the question answered, as to whether it is a case of one or more sorts or varieties. I do not doubt, that it is a matter of one species, which in my opinion is definitely variable. If only there had been similar photographs of other species ! On further snapshots we also found G.megatae in flower.

And now about the Japanese plants, which were grown from seed whose origins are, like ours, for no one has been able to find any in habitat other than A.M.Friedrich. In Japan it is known under two names, that is "Sui Ban Gyoku" and "Byoku Ban Byoku"; the meaning of these common names is not known to me. Yoshio Ito, in 1957, named them G.megatae and G.tudae; in the description he says that they are very similar. Both plants are broad, shield-shaped, flattened, ribs formed into tubercles of horse-shoe shape. Spines yellowish-green when new, flowers white. What, according to Y.Ito, distinguishes them? The body of G.megatae was light green, of G.tudae blue-green. G.megatae has five spines, pale coloured in old age -

G.tudae has 7, but darker later. It is of interest that in Japan also these plants reach a diameter of 150 to 200 mm. Slight differences of course fail to distinguish two species. If Y.Ito had had our pictures at his disposal, surely he would not have described two species. We can now, then, say on the basis of the knowledge of the full material, that G.tortuga from now is validly named G.megatae and all other names - especially the same G.tudae - are synonyms.

In the year 1964 there was finally imports brought in too, of which one is in the accompanying photograph (in the Czech Journal - H.M.). The firm Karlheinz Uhlig offered it as G.marsoneri, as it was now designated by C.Backeberg. Again this is not correct, for it is also necessary to appreciate that the plants written about resemble G.marsoneri rather than G.michoga. Of course the shape of the ribs is absolutely distinct; G.marsoneri has low and flat ones, while those of G.megatae are tall, sharp-peaked and divided into strong horse-shoes. G.megatae reaches its final characteristic form only in later life. Most plants in our collections are still young, immature forms which will grow up into full beauty only towards a diameter of 150-200 mm.

It still remains to mention a few details. The name "tortuga" does not come from A.M.Friedrich; illustrated here (i.e. in the Czech Journal - H.M.) are plants so-called by H.Blossfeld and O.Marsoner. Large plants really do resemble the shape of tortoises. The note in their catalogue, which referred to a species with three spines, is either a translation or a printing mistake. Like the original plants on discovery, namely 5 to 7 spines, so also in cultivation with us and in Japan. Only now have imports arrived also with three spines, of which I have one in my collection. In the catalogue was a further piece of information, that the plants are black; imports are really very dark green and seedlings are also with me practically black. Of course if they are grown under glass, they may be (from the necessary shading) paler. Thereby is it possible to explain Ito's statement that G.megatae is light green and G.tudae blue-green.

It is probable that a further Ito plant too - G.onychacanthum - belongs to the G.megatae species-complex. The description corresponds to it, but the information from habitat is different. It will be necessary to correspond with him, in order to ascertain where the author got his opinion from, that it is related to Uruguayan plants. In our collections are numerous similar Gymnocalyciums under the names "seminudum", "karwinskyanum" and "rotundicarpum". From these, G. fricianum Plesnik was validly described. The names seminudum, karwinskyanum and rotundicarpum are shrouded in something of a mystery. I have been unsuccessful in finding out where the seeds came from and who gave them these names. There exists nowhere in the whole of the cactophile world whatever notes were made by the late Mr Suba. Seedlings very greatly resemble G. megatae; eventually however we may be able to ascertain the origin of our seeds when seedlings reach such a size that it is possible to judge their appearance at the stage of full maturity.

In the meantime it will be necessary to rename each plant, which is in a collection as G.tortuga or G.rysanekii, as G.megatae. Furthermore it will be necessary to rename imports distributed as G.marsoneri and coming from Paraguay as G.megatae as well. It will be necessary to give further attention to other similar plants and generally grow them on to a diameter of 150 to 200 mm when they display characteristic rib forms - strong tubercles in horse-shoe shapes.

G.megatae flowers profusely over the whole year like the other Paraguayan plants e.g. G.damsii and G.mihanovichii. Flowers develop from the areole farthest from the centre, are tiny in relationship to the bodies of the plants and largely resemble the flowers of G.damsii. Some forms even had dark anthers. It belongs to the Muscosemineae group, section Periferalia.

This article about G.megatae was written in August and recently further information reached me about this particular species. Out of this the most interesting point is that A.M.Friedrich has found G.megatae at another habitat, this time at Nuova Asuncion. This is the airport at the north-western tip of Paraguay, about 35 Km north of Yrendangue. The new location is separated by about 400 Km from the original habitat (V.Militar, Isla Poi). The distribution of G.megatae - just like G.mihanovichii and G.damsii - is thus very extensive. Mr.Moser communicated to me

that he received from A.M.Friedrich nine imports from Nuova Asuncion; the largest have a diameter of almost 200 mm. There are there mainly low and flat plants, whose number of ribs vary between 10 and 21. Variability, then, is even greater than we had known from the previous habitat. In the autumn of last year, I obtained further imports (from the original habitat) which had even 9 radial spines and at some areoles one central spine also.

Comments on Gymnocalycium megatae.

... from H. Middleditch.

"During our 1964 Cactus Tour we paid a visit to K.Uhlig at Rommelhausen and in his nursery we found some very interesting plants of imported Gymnocalycium on the staging. There was a batch of plants labelled G.marsoneri which seemed to be very flaccid indeed, about saucer sized and so shrunken and depressed that they were also very nearly saucer shaped. Their colour was a dirty reddish brown with precious little green tint to be seen. At the time I was suspicious that some could already have been either dead or irrecoverably shrunken, but nevertheless I bought the smallest and least flaccid specimen. Since that date I have been unable to find any useful background information on this plant until the above article was available, so that in consequence I find Dr.Schutz' article very interesting. The illustration of "G.marsoneri" which appears with the original article in the Czech Journal is very similar to my own plant, in having very sharply peaked slab-sided ribs and spines radiating sideways from the areole, not pointing away from the body at all.

"Having seen many of the ex-Lau imports received by collectors in this country in the same flaccid condition as those which I saw on the staging at Uhlig's nursery in 1964, I never cease to marvel at how many of them have been nursed back into growth, filling out and greening up quite remarkably. Those ex-Lau plants which have been commercially distributed under the names of G.izozogzii, G.eytianum or G.chuquisacanum (see Chileans No.21 pp 79-85) would appear to be very similar to the illustrations of habitat growing plants of G.megatae which accompanied the article by Dr.Schutz. The ex-Lau plants do seem to flower from the shoulder of the plant, whilst on the G.megatae illustrated, flowers spread from the shoulder to the centre of the plant.

"It is interesting to note that Dr.Schutz refers to some forms of the plant even having dark anthers. I wonder whether by any chance this could be a case of differences in colour between the pollen sac and the pollen. I have noticed quite marked differences in these colours on a Trichocereus flower (cream anthers, grey pollen) and on a Cotyledon grandiflora the rich purple anthers opened to reveal moss-green coloured pollen. It is rather difficult observing the colour of the anthers when the pollen sac is unopened on many of the Muscosemineae as the anthers tend to be covered up by the inwardly curving filaments. This is something that I can look out for during next season.

"At a Chileans get-together in the north-east we had a look at the set of Gymnocalycium slides borrowed from the Austrian Society (G.O.K.) slide library. Among these was a plant labelled G.marsoneri which was carrying a pair of fruits; one of the fruits was presumably immature being bluish-green in colour and barrel shaped. The other fruit was almost twice as large, lemon shaped and pinky-red, presumably mature. This latter fruit was rather reminiscent of another batch of Gymnos seen at Uhlig's nursery in 1964; these were not so large as the G.marsoneri offered for sale there, nor as flaccid. The bodies were more of a bluish-green colour, and they were labelled G.damsii v. delaetii. However the most remarkable feature of this particular batch of plants was the numerous lemon-shaped fruit of a pink or pinky-red colour about 25 to 30 mm high and some 13 to 15 mm broad - very similar to those on the G.O.K. slide of "G.marsoneri". Some of the fruits on the Uhlig plants had keeled over and rested upon the plant body, no doubt due to the thin tapering neck and the size and weight of the fruit. All these fruits were carried near the crown of the plant, again as in the G.O.K. slide. It is now much to my regret that I neither took a photograph of these plants nor acquired one of them. Perhaps I should keep my fingers crossed and hope that one of our readers who was on that Tour may perhaps

have a slide of these particular plants.

"The reference by Dr. Schutz to the photograph taken in Asuncion, showing many different species of Gymno's side by side in A.M.Friedrich's collection, leads one to wonder if the insects flit from flower to flower in Asuncion as they do in our collections in Europe? If the seed sold by Friedrich to Blossfeld and Marsoner had been collected off plants in his own collection, was it any surprise that the seedlings "varied greatly". Most hybrids do. If the seedling plants and seeds sent to Guenther Moser by Friedrich also came (even in part) from his own collection, is it not to be expected that there will also be considerable variation between plants of a so-called "species" (N.C.& S.S. Journal June 1970 pp 34-37). It would be most illuminating to be able to see some seeds from the plants depicted in the illustrations therein, to find out whether they showed signs of characteristic features of more than one basic Gymno group.

"Bearing in mind the characters which have been adopted by those Czech growers who have described new species of Gymnocalycium, one does wonder if the author's comments that "the few distinguishing features used by Ito fail to justify two different species" is perhaps a case of the megatae calling the tudae black!

"All this still leaves me without a lucid description of what G.marsoneri or G.michoga are supposed to look like; and, to a lesser extent, even G.tudae. And I wonder also why G.megatae has precedence as a name over G.tudae? And what, Oh what! really is that plant that produces those large lemon-shaped pink coloured fruits? Is it G.tudae, per Y Ito's "bluish-green body"? So should Lau 371 and 374 be G.megatae?"

... from E.W.Putnam

"The confusion around Gymnocalycium megatae, G.tudae and the host of other names of obviously related closely - if not indistinguishable - plants has been a real witches' brew of all that is worst in cactus nomenclature and records. Thus one is delighted to have information which throws at least some light on the situation. Dr.Schutz, Guenther Moser and John Donald have all endeavoured to disentangle the muddles and it is now possible to make some sense of it all. I am a very long way from being qualified to pronounce on these matters myself and hope that an authoritative comment will be forthcoming from John Donald in these pages.

"Having laboured many a long hour over lists of names, valid and otherwise, used for Gymnocalyciums, I was glad to see several obscure names mentioned by Dr.Schutz. G."seminudum" in particular cost me much labour in my fruitless attempts to discover its origin, or even any reference to it in the literature. Some seed so named failed to germinate for me, so I could not even see what the plants might look like. Dr.Schutz also confesses to mystification, but he does at least tell us that seminudum, karwinskyanum and rotundicarpum are names for plants like G.megatae and that G.fricianum Plesnik originated from among them.

"I think that John Donald's articles in recent issues of the N.C.& S.S.Journal (Vol 26 No.4 and Vol 27 No.1) will have clarified some of the points raised by Mr.Middleditch".

... from G.H.Swales

"The Muscoseminae group of Gymnocalycium were divided into two sections by Dr.Schutz in accordance with the position of the flowers - either close to the growing point or out on the shoulder of the body. The validity of this method of division would seem to be open to question and in his later writings Dr.Schutz appears to acknowledge this. The Buxbaum-Frank classification of Gymnocalycium is based on seed characters, in which the Muscosemineae are divided into two groups - one group based on G.schickendantzii and a second group based on G.mihanovichii. I find little difficulty in recognising either of these types of seed under the microscope, but I have also found a quite distinctive seed on some plants in the Muscosemineae, which differs from the two types illustrated by Buxbaum. This third seed group appears to be associated with G.tudae and its close allies, but more detailed study of the various seed samples will be required

before any soundly based comment on these lines is possible".

... from J.D.Donald

"At the moment I would only comment briefly that G.tudae and G.megatae are not exactly identical, as proved by the Horst-Buining-Friedrich expedition of 1970/71 - they are obviously close but at least a varietal difference separates them. G.marsoneri is a little more difficult to determine, as it depends upon whether Argentina or Paraguay was its original habitat".

- So far, we have no slides of G.tudae in the slide library, either under that name or masquerading as G.eytianum, izozogzii, etc. - A.W.C.

NEOPORTERIA WAGENKNECHTII Ritter Spec.Nov.

(Translated by W.W.Atkinson from Succulenta for January 1963).

Neoporteria wagenknechtii Ritter

Corpus 15-30 cm altum, 5-11 cm diam., griseoviride, sine radice rapacea; costae 11-17, obtusissimae, tuberculis mentiformibus, areolis 6-13 mm longis, 5-7 mm latis, 5-10 mm remontis, griseis vel brunnescentibus; spinae aciculares, radiales 10-14, 15-25 mm longae, rectae, griseoatrae, centrales 3-6, 20-30 mm longae; ovarium et tubus floralis albofloccosuli, sine setis, tepala 7-12 mm longa, 3-4 mm lata, purpurea, interiora ± incurvata; stamina inferiore parte tubi inserta, alba; stylus albus, superne brunnescens vel rubea; fructus cupaeformis viridis vel rubescens; semina crumeniformis brunnea, cum verrucis planis paucis obstitis.

Habitat in a ravine at Juan Soldado, northwards from La Serena, Chile.

Holotype in the herbarium of the University of Utrecht under my field number FR 715.

Body 15-30 cm high, 5-11 cm wide, grey-green, without tap root.

Ribs 11-17, very obtuse, with chin-like humps.

Areoles greyish to brownish, 6-13 mm long, 5-7 mm broad, 5-10 mm apart.

Spines greyish-black; side spines 10-14, 15-25 mm long, straight, centrals 3-6, 20-30 mm long.

Flowers 22 mm long, ovary and tube with small patches of white wool, without bristles; nectar chamber 2 mm long, saucer shaped below, more or less tubiform above, closed.

Petals 7-12 mm long, 3-4 mm wide, purple, the innermost inclined inwards.

Stamens inserted up to slightly above the middle of the flower tube, white; style white, brownish or red above.

Fruit barrel shaped, green to reddish.

Seed bag-shaped, brown, with few flat knobs.

A splendid species in culture, often with red shades to the body, and outstanding purple-red flowers, which are produced continually for several months in the autumn.

Neoporteria wagenknechtii v. napina Ritter

A typo recedit radice rapacea magna, apice angustata, spinis longoribus curvatis, flore maiore, tubo floralis albosetuloso.

Habitat. In the mountains of Cjoros Bajos, to the north of la Serena, N.Chile, there collected as FR 714. (Syn.N.rapifera - H.M.).

This variety differs from the type:- in its large tap root, which is narrowed in the neck, in the longer and curved spines, the larger flowers and the fine white hairs on the flower tube.

A closely related new species is:-

Neoporteria microsperma Ritter.

A N.wagenknechtii (cf. sp. precedentum) recedit: costis minus profunde crenatis, mentibus parvis, areolis 3-5 mm remontis, spinus curvatis, tubo floralis longiori, setuloso, seminibus minoribus.

Habitat: 15 Km east of La Serena, N.Chile, and collected under the number FR 535.

Holotype in the Herbarium of the State University, Utrecht. N.microsperma differs from N.wagenknechtii in its less deeply separated ribs, short chin-like tubercles, areoles half as far apart, curved spines, longer flower tube with fine bristle-like hairs and smaller seeds.

Neoporteria microsperma v. serenana

A typo recedit, corpore majore, costis latoribus et altioribus, areolis maioribus, spinus fortioribus.

Habitat: 15 Km eastwards of La Serena, N.Chile.

Holotype: Utrecht, as above, field No. FR 716a

Differs from the type species in the larger bodies, broader and higher ribs, larger areoles and powerful spines.

Comments on the N. wagenknechtii group

... from J.D.Donald.

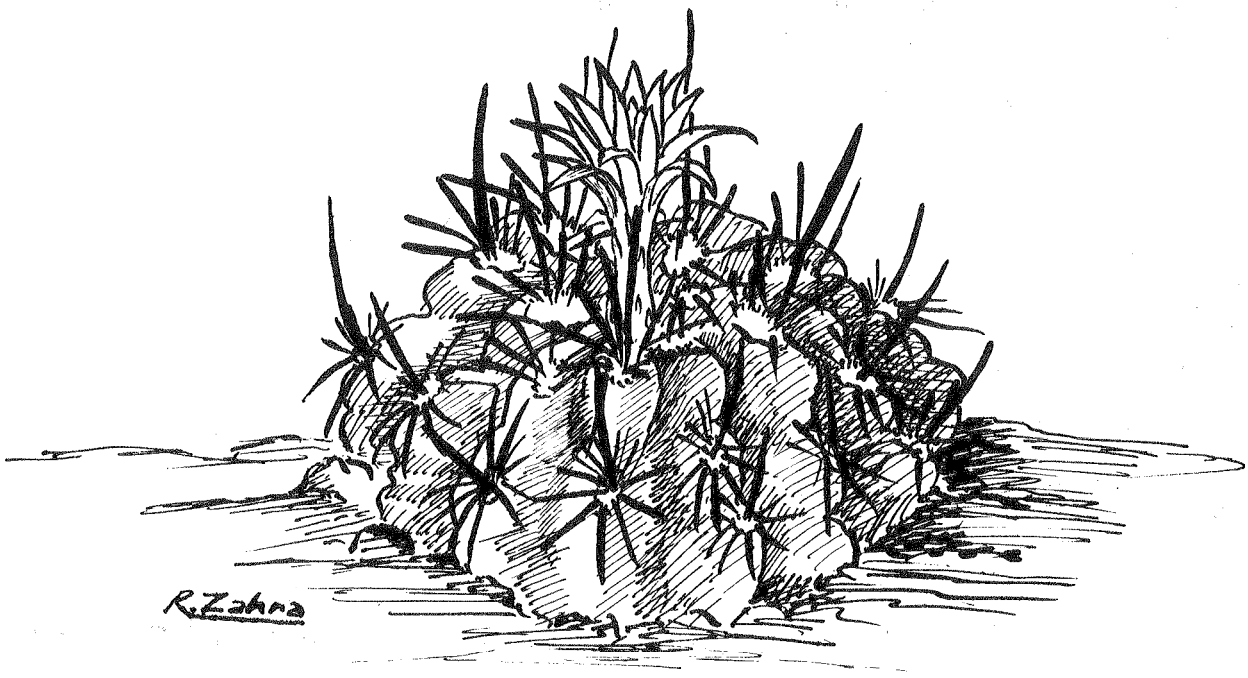
"Neoporteria wagenknechtii v. napina (synonym N. rapifera FR 714) is one of the easiest of Neoporteria to flower along with its species N.wagenknechtii FR 715. Easily raised from seed and four year old plants 2.5-3 cm in diameter should flower regularly each autumn. The variety napina differs from the species in its generally shorter and blacker and stronger spines than the type in which the spines are usually yellowish to brown-black, longer, more flexible and incurved. The flowers of the variety napina are somewhat larger and deeper coloured than those of the species. More than one flower may be produced at each areole - the species is particularly prone to this and up to 5 flowers per single areole have been recorded in one season.

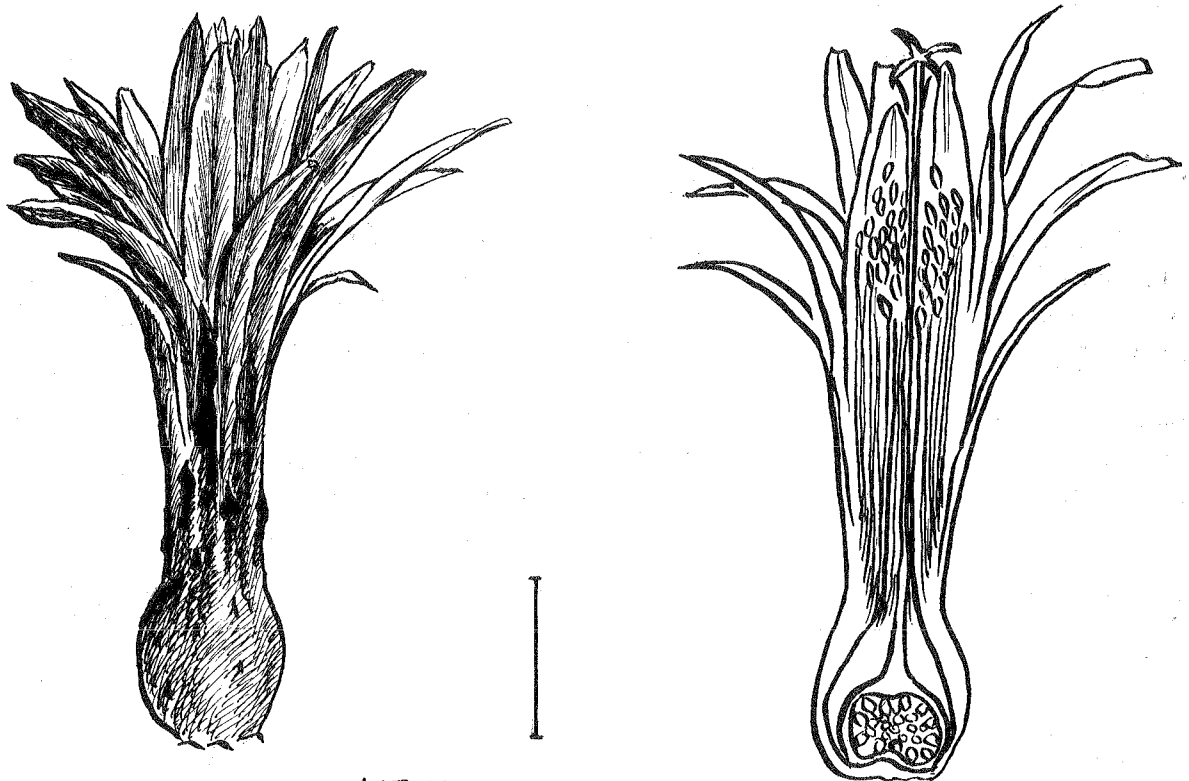
"The plants occur in the Coquimbo-La Serena area on the Chile coast and form a close association with other Neoporteria species from this region: N.coquimbana FR 218, N.clavata FR 482 and N.clavata v. procera FR 716. In old age N.clavata becomes quite cylindrical."

... from H.Middleditch

"The various plants referred to in this article have been fairly readily available for some years now and I have seen quite a number in members' collections. I was becoming suspicious that either some labels had been confused somewhere along the line or else that there was a close affinity between N.rapifera and N.microsperma, but for some reason I had never surmised a close relationship between N.rapifera and N.wagenknechtii.

"I have always thought of N.wagenknechtii as a very spiny plant with straight, pale brown spines standing more or less upright at the crown and overlapping there only very slightly and also standing more or less straight out from the body at the shoulders and the sides; on taking a rib count I find that my plant of wagenknechtii has 14 ribs, whereas my rapifera has only 10 and so the latter looks much more open in spination. The areoles on wagenknechtii never seem to be





ACTUAL SIZE OF
FLOWER

NEOPORTERIA RAPIFERA – Collection R.Zahra

Plant x 1 1/2 Flowers x 4 1/2.

as large and obvious as on rapifera, but on examining the two plants together I see that they are in fact about the same size and about the same colour. On wagenknechtii they do not stand out well against a light green body - perhaps one might even describe it as greyish-green. The areoles on rapifera are much more obvious against the deep blackish-red tinge of the body. The spines on rapifera always conveyed to me the impression of standing upright on the crown like the bristles in a broomstick but when I look closely I see that they are almost the same in this respect as on wagenknechtii - it is just that on rapifera they are nearly black with a patchy thin chalky coating and so each areole-full of spines can be more readily distinguished.

"Over the last few years each of these plants has been making valiant efforts to flower, along with N.microsperma. Possibly because our season starts later and is shorter than in the south of England, these buds do not usually start to appear until late October; they get scant encouragement from the wan sun before the muggy November days must surely discourage them, for ere long the buds appear to be growing smaller. Perhaps a few bright January days with the sun reflecting brightly off the snow encourages them to try again and one or two might struggle up and flower, whilst others retreat once more, whilst the sun never even appears for a week or two at a time during the dull days of February. And now, the low March sun is raising steam off the south facing exterior of the greenhouse and one or two buds are making yet another attempt to grow up into flowers - perhaps they will be successful as one or two have been in previous years.

"My impression of N.microsperma as a plant with more curving and slightly more powerful spines than N.wagenknechtii or rapifera has finally been confirmed by sight of Ritter's diagnosis; however, a look at the sample plants which I possess would not seem to bear out the closer areole spacing on microsperma. Indeed, I always tended to regard microsperma as a plant on which one could pick out each set of spines quite readily; again this may be due to my plant of microsperma having 12 ribs as against 14 for my wagenknechtii. The spines on the plants of microsperma which I can recollect having seen would all be lack with a coating of variable chalky-white, so that the spines appear black, dark grey or pale grey depending upon the extent of this coating.

"It is also interesting to see John Donald relating three other plants to this group; my impression of the spines on N.clavata is of a shape and size comparable with microsperma but much stouter and more widely spaced; a check on rib count reveals that my plant of clavata has 10 ribs, and of clavata v. grandiflora 11 ribs - this compared with 12 ribs for my microsperma again explains the differing impressions of spininess.

"Although this article from Succulenta might almost be felt to be in the vintage category, being nearly ten years old, it has provided me with much useful information and illustrates yet once again how well-served have been the collectors on the Continent with information on South American cacti".

... from D.Rushforth

"My plant of N.rapifera usually flowers well in winter - even in January. My own plant is much more globular than that sketched by Rene Zahra and is dark green in colour; it was grown from seed ex de Herdt, sown in 1965 and flowered when 3 years old.

"If by ribs we refer to a continuous ridge running apex to base then N.rapifera has no ribs. The areoles, which differ from the plants in H.Middleditch's collection in that they are almost round, perhaps 6 x 5 mm, about 10 mm apart and set on prominent chins. The spination is different too, as on the mature areoles there are two long spines 30-40 mm long, which only someone with a kink would regard as bent, less than 1 mm thick at the base and needlelike. They are dark brown in colour but soon go grey. In a juvenile stage there appears to be but one central spine much shorter than above. There are 9 to 11 radial spines, c. 20 mm long and standing well away from the plant body. The flowers on my plant are about the same as those on the sketch, which seem to me to be rather small for Neoporteria flowers".

... from R.W.Cotton (W.Australia)

"For longevity of flowering I would like to hand the blue ribbon to Neoporteria wagenknechtii. At approximately four years old, it produced its first two flowers in the month of August. In the following January it came into bloom again and was never without a flower from then until September. In July I removed 74 dead flower remains, leaving about 12 seed pods. I have learned that there is a variety 'multiflora', in fact I have it as a seedling, but if it does any better than the type then it will be quite something.

"I have found that the subgibbosa type of Neoporteria is very slow to flower, in fact my specimen of ten years of age is just coming into flower for the first time, whereas rapifera, villosa, etc flower when quite small.

"My plants receive no artificial heat, having to take such weather conditions as come along; the lowest temperature I have ever recorded is 28°F whereas in the summer we run up to 106°F. Frosts are very rare in my own particular piece of ground but we have had snow on a couple of occasions in the last 3-4 years. The greenhouses are both very well ventilated with lath or wire netting sides and the cold frames only have the fibre glass covers in place at night in the winter and during rain. The plants that I have under these conditions seem to appreciate it".

... from E.W.Bentley

"I have a fairly old plant of N.wagenknechtii which flowers profusely every autumn, often with two flowers to each areole. I also have a young N.rapifera with a grass-green body, whilst an older plant of rapifera is wholly dark purple and shaped much like that in the illustration. The spines from the youngest areoles are very black and point upwards and over the growing point - a wigwam of spines exactly describes it.

"N.nidus, villosa and mammillaroides are also in flower this spring and N.chilensis and subgibbosa are coming into bud for the first time. Perhaps it is a question of how long they take to reach flowering size, for some of the plants are 8 or more years' old".

... from G.E.H.Bailey

"My Neoporteria wagenknechtii was purchased quite a long time ago from Abbey Brook nursery. Its flower is not very Neoporteria-like but it does not have the thick yellowish tap root which Backeberg attributes to Neochilenia wagenknechtii. The body is a lively green, with 18 ribs, creamy yellow areoles, becoming greyish, about 14 fine radials 15 mm long and about 8 centrals 25-30 mm long. This plant took a long time to come to flower but now performs regularly.

"I have three plants of N.rapifera from seed which have not yet flowered. Two of these plants are dark green, with fine spines, and the third is a lighter green with coarser spines, which is just the reverse of what Backeberg says".

... from I. le Page

"I have a small plant of N.rapifera from De Herdt's seed which was sown in 1969 and this flowered quite well in February and March of this year (1972). The plant produced a total of nine flowers which were 2.1 cms long and 1.9 cms in diameter, of a reddish colour with a pale throat. They remain open for several days - if not for weeks! "

... from P.H.Sherville

"My N.rapifera came from Schliepfer as a seedling; I have noticed several areoles which have produced two flowers - firstly one flower blooms and withers and when it has almost withered up, then the second bud from the same areole will be appearing".

We have slides of both Neoporteria wagenknechtii and N.rapifera in the slide library - A.W.C.

A FURTHER LOOK AT LOBIVIA SEED by J.Hopkins

Since my brief note in the last Chileans I have been able to examine a fair number of species of Lobivia seed, most of which was imported material from Sargant together with Rausch-collected seed obtained from the Dutch Cactus Society seed distribution. On top of this I have recently received about 30 different species of seed from de Herdt and I have ordered some more from New Mexico Cactus Research - not many of the latter, on account of the price. I was disappointed that we missed getting any L.zecheri seed from the Succulenta list as this is the one Rausch says is different from all other Lobivia seed. There was also a useful sketch of L.famatimemsis (Speg.) seed in the Dodonaeus journal, accompanying Buining's article on this plant.

All these seeds seem to fall into about five or six groups, together with a few species which do not seem to fall readily into any one group. I have been able to look up the habitat data - even if only given in very general terms - and this suggests that these various seed groups correspond to certain geographical areas. I have sent off for some fairly large-scale maps of parts of Bolivia and Peru covering the Lobivia area, which should help in locating more habitat names.

One or two problems have arisen. There are the two Lau-collected species from Churin and Oyon (churinensis, oyonica), both far to the north of other Lobivias, except for L.wrightiana and L.tegeleriana, both isolated in Mantaro-Tal. Their nearest relatives are L.westii at Andahuaylas but none are in the same seed group. Lobivia wrightiana is the most consistently large seed I have yet seen. Another puzzle is L.multicolor which is geographically right in the middle of a different group of seed. Lobivia vilca-bamba also appears to differ in seed form from adjacent species of Lobivia; perhaps I have some wrong seed? The maps will be very useful here as there are three Rio vilcabamba!

I am interested in the idea that Lobivia flowers may have either hairy, naked or even areoled tubes. I am a bit dubious about the latter two. The only naked tubed Lobivia is surely L.saltiensis which I believe was lost for many years. I also think that L.lauramarca has been found with the occasional naked flower tube. As for areoles, surely there must have been some longish hairs present as well? I will have a good look at the Lobivias in the slide library. It looks as though it might be rather a problem to try to get information on the flowers and the fruits to see if these characteristics tie in with the seed groupings. I have had the loan of a few slides of Lobivias in flower and there does seem to be some correlation between seed groups and flower form, but there are exceptions. I am trying to persuade people with good collections and equipment for close-up photography to do some flower sections for me and I will also be doing this on my own flowers this summer.

Some of my own Lobivia were coming into bud in mid-April so perhaps I might get more information from them than I had expected. I am particularly interested in seeing L.lauii in flower as its seed is in a small group peculiar to the Urubamba valley, whereas plants in a different seed group occur both to the north and south of this area.

Having kept about half a dozen examples of each species of seed, I sowed the remainder and this was starting to germinate quite well towards the end of February. About a month later we had a few days away from home and a near disaster seemed imminent on our return. I got back to find that many of the seedlings had turned quite white. I put this down to something inhibiting the formation of chlorophyll. Two pans of seed growing in Levingtons compost were in no trouble but with one pan I had gone back to my original scheme of growing in a layer of sand on top of some J.I.No.3. All the pans had been watered with a mild solution of Buxbaum's salts, but I cannot think that this should do them anything but good. I began to wonder if there wasn't something wrong with the sand which could have caused my trouble, so I spent

three evenings pricking out all the germinated seedlings and salvaging some of the ungerminated seed and resowing in Levingtons. I am relieved to say that they now seem to have recovered.

"I had prepared some sketches of typical seeds in each of the groups but now I have much more seed this will need a little revision".

The seed sketches have now been received and will appear in a forthcoming issue of the Chileans. Any slides of plants in flower (or flower sections) will be of appreciable interest to the author, on loan - H.M.

Comments on Lobivia

... from G.E.H. Bailey

"Lobivias are a family which I find very interesting - and tantalising in their nomenclature! I wonder how many true species there are? L.rossii appears to be slightly scented whilst L.westii is an interesting one - long pointed orange petals, lasting 2-3 days and with areoles on its seed pods, just like the Acantholobivias, but very definitely day flowering".

FORTHCOMING ARTICLES

We should be pleased to hear from any of our readers who have successfully established any imported Weingartia; or had fruit set on Neowerdermannia; or flowered Gymno. stuckertii; or set fruit on any Weingartia; or flowered any of the newer Sulcorebutia such as flavissima, vasqueziana, alba, crispata, etc.; or grown any of the less common Brazilian cereiform plants like Stephanocereus, Leocereus, Brasilicereus, etc; or grown Gymno. marsoneri.

ERRATA NO 21

p.60 line 3 should read "... he observed, if he had gone ..."

p.64 line 13 should read "... rather more conical shaped..."

p.80 line 24 should read "... Rausch, and also Buining,..."
line 45 should read "... is Cardenas's discovery..."

p.82 line 14 should read "... comarapense,..."

p.86 On the flower section of "Gymnocalycium species sold as G.izozogzii" a single row of filaments was omitted from immediately above the nectar chamber, leaning against the style.

p.94 line 3 should read "... he observed, if he had gone ..."

p.97 line 2 should read "... as previously thought ..."
line 32 should read "... 5" half-pan filled with compost ..."

p.99 line 8 should read "... on the flower-bearing areoles ..."

p.103 line 4 should read "... became further exserted on a ..."

p.108 line 46 should read "..., but the stem is flattened to a ..."

p.110 line 2 should read "... Ritter rediscovered C.goebelianus..."

ANNUAL REPORT AND ACCOUNTS 1.4.71 to 31.3.72

Income		Expenditure	
Subscriptions	£314.25	Printing	£589.65
Subscriptions in advance 1972-73	35.12	Postage, Stationery etc.	108.50
Sales of Year Books	50.23	Plant purchases	153.98
Sales of Back Numbers	157.38	Invoice outstanding £129.72	
Sales of Index	32.45	Nett balance c/f 258.45	
Sales of Plants and Seeds	235.52		
Bank Interest	12.74	Balance c/f	388.17
Refunds from printers	15.73		
Sundry income	18.92		
Balance brought forward	367.96		
	£ 1240.30		£ 1240.30

The increase in subscriptions which was required last year still left publishing costs about £150 behind subscription income, so that subscribers continued to receive the advantage of this subsidy. In particular, the overseas subscription figure fell even further short of actual outlay than did the U.K.rate, a situation which should be rectified in the forthcoming year. Although there has been only a small increase in the U.K. subscription this year, the recent sharp increases in home and overseas postal charges are bound to have an adverse effect on our expenditure for '72-'73.

It is a pleasure to be able to record our appreciation for the sterling work done by Eddie Barnes in running the seed pool since its inception. Owing to pressure of work he has been obliged to give up this activity and we extend a welcome to John Hopkins who took over the Seed Pool at fairly short notice and who will be equally pleased to receive your spare seeds.

We were sorry that Carl Lazzari was prevented by other commitments from contributing as many of his fine drawings in this past year as in previous years. We hope that his drawings will be returning to our pages in the future. We have been fortunate in receiving support from other artists whose contributions all enhance the appearance, value and interst of our Journal. We are also indebted to all our translators without whose efforts we could not continue to place before our readers information not otherwise available. However, any offers to undertake translation from the Czech will be warmly welcomed.

The Slide Library benefited during the year from many donations; we are grateful to those readers who took the extra shot of an open flower and passed the spare slide on to us. Fewer slides were copied as the copy is never quite as good a quality as the original. Income and expenditure was again in balance on the slide library.

Whereas our earlier Journals included translated articles and comments thereon, more recent issues have tended to cover the subjects concerned somewhat more thoroughly, with details of flowers, study of seeds, and research through older publications, whenever this has been possible. However, this has appreciably increased the time required to prepare an issue and whilst we have always worked to the flow of information and not to any timetable, it may happen that a future year will not afford sufficient time to produce three issues; should this occur a subsequent renewal subscription would be at a reduced rate.

I am, as always, indebted to our honorary officers and many readers for all their work and contributions, great and small.

H.M.

STUDY GROUPS/ROUND ROBINS

Cleistocacti	T.Lavender, 62 Finchale Avenue, Billingham, Teesside TS23 2EB
Copiapoa	D.J.Lewis, 80 Pencisley Road, Llandaff, Cardiff CF5 1DQ
Epiphytes	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ
Frailea	J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland.
Gymnocalycium	G.J.Swales, 5 Hillcrest, Middle Herrington, Sunderland, Co.Durham
Lobivia	J.Hopkins, 25 Crossefield Road, Cheadle Hulme, Cheadle, Cheshire SK 8 5PD
Matucana/Borzicactinae	Contact the Chileans
Mediolobivia	J.R.Chapman, 5 The Crescent, Raunceby Hospital, Sleaford, Lincs.
Melocactus/Discocactus	Mrs L.Teare, 7 Birkinshaw Avenue, Tranmere, South Australia 5073, Australia
Neoporterianae	D.Rushforth, 80 Cheltenham Road, Cloucester GL2 0LX
Notocactinae	K.H.Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton.
Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lincs.
Photographing Cacti	A.W.Craig, Davela, Forest Lane, Kirk Levington, Nr.Yarm, Yorks.
Sulcorebutia	W.G.Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs FY5 5EG
Trichocereus	N.T.Hann, 5 Lake Road, Shirley, Croydon, Surrey CR0 8DS

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