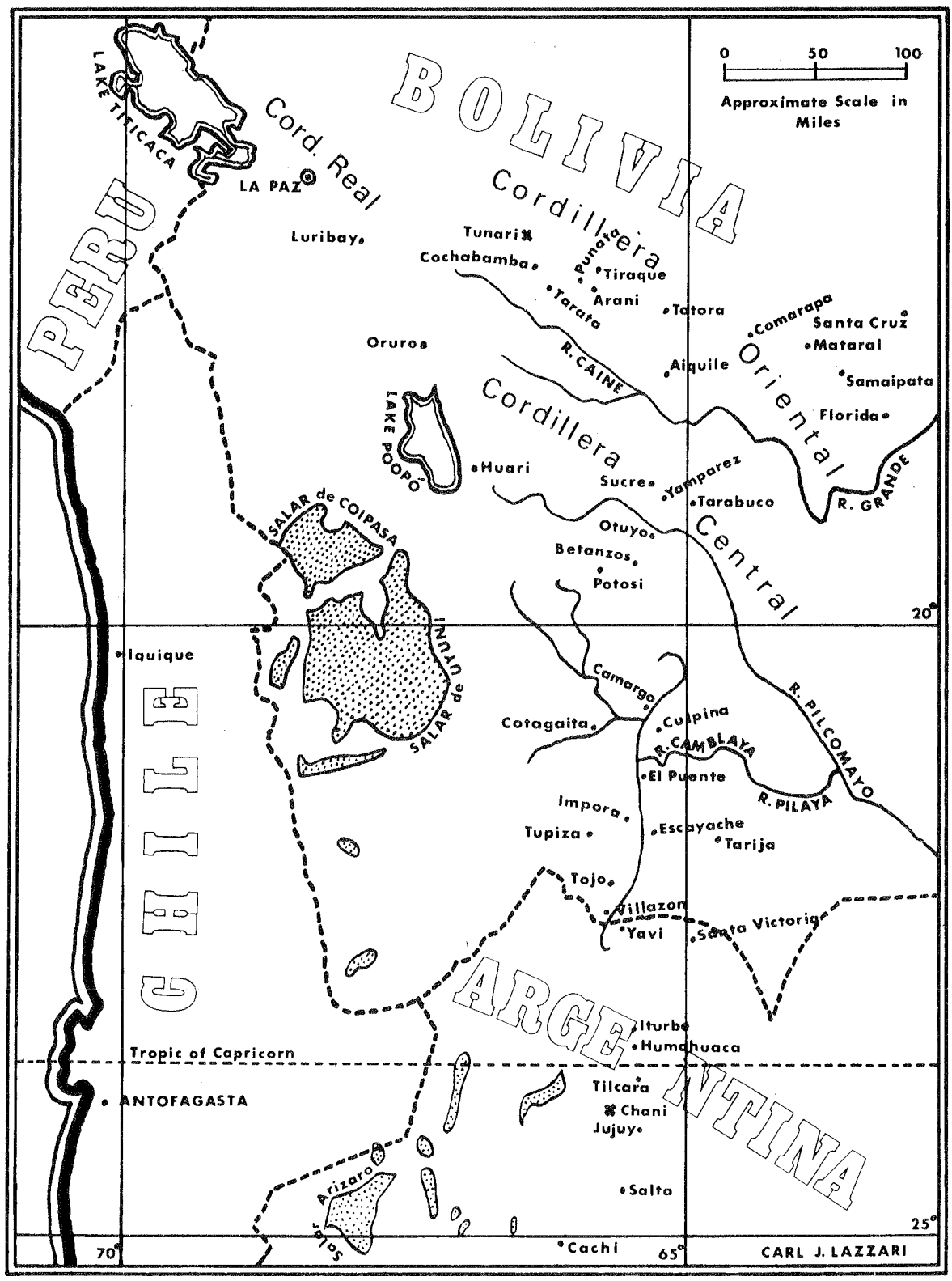
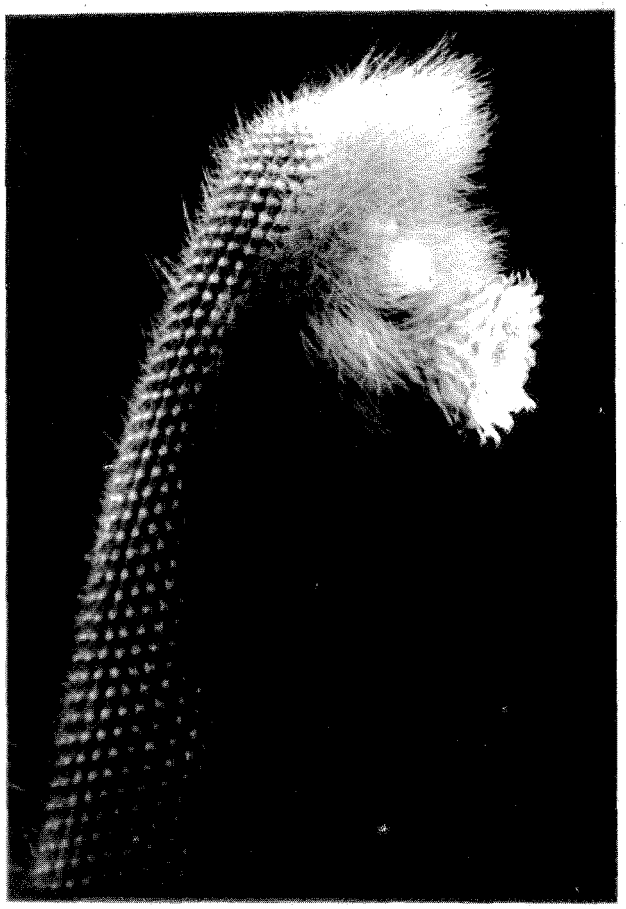
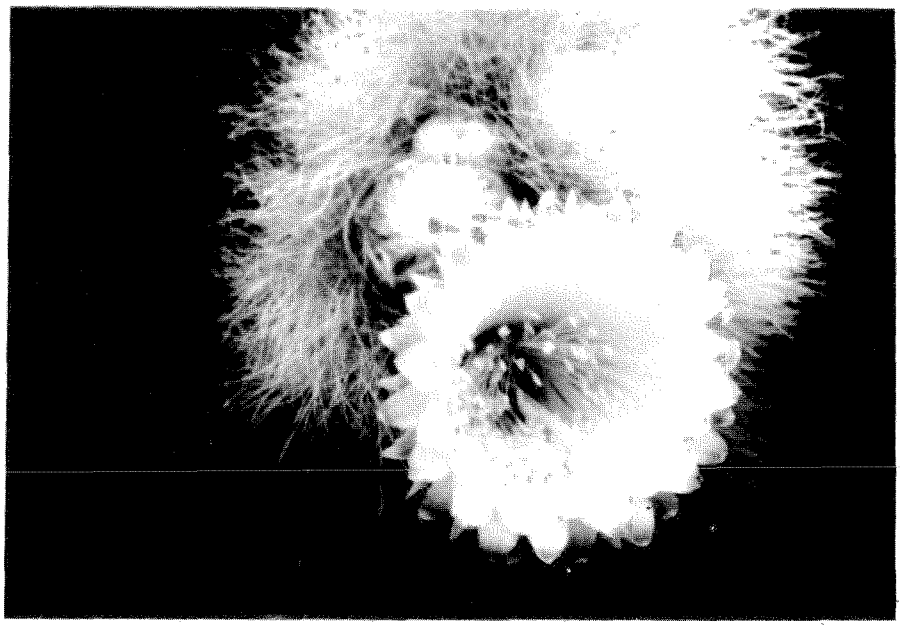
THE CHILEANS '69

VOLUME 3 NUMBER 13







VATRICANIA GUENTHERI

Collection & Photograph – H. MIDDLEDITCH

VATRICANIA GUENTHERI (Kupp) Backbg.

By H. Middleditch

This plant was discovered by C. Troll in 1927 and is of particular interest on a number of counts. It was found in the valley of the Rio Grande in Chuquisaca province in Bolivia (see map, frontispiece) near El Oro. This location is widely separated from the great majority of cephalium bearing columnar cacti, the nearest being in central to northern Peru and even further away to the east, in Eastern Brazil. This species is thus very isolated from any others with similar characteristics.

The plant was first described by Kupper in 1931 as Cephalocereus guentheri. In 1950 Backeberg erected the genus Vatricania for this one species on the grounds of its cephalium and flower characteristics. In Die Cactaceae Vol IV, Backeberg says that the flowers differ from those of Espostoa and Thrixanthocereus in being more tubular than bell shaped, that the petals do not open fully and that the tube is thickly clothed with silky hairs.

Backeberg's illustrations show that the cephalium on Vatricania is externally somewhat similar to that on Thrixanthocereus, being fairly broad with a substantial body of wool and bristles right up to the crown, whereas the cephalium on Espostoa narrows and shortens as it approaches the crown. However, the cephalium on my Vatricania appears to differ markedly from that on the other two genera - in these, the cephalium arises from a groove running vertically up the side of the plant. This groove is not at all obvious when viewing the plant as it is filled by the cephalium (see Chileans No. 10 p.8.); it is rather difficult to examine the root of the cephalium on my Vatricania, other than round the edges, but there does not seem to be any depression or groove on the side of the plant covered by the cephalium.

The mature cephalium on Vatricania is also peculiar in that it spreads round the full circumference of the stem and right over the growing tip, like Cephalocereus senilis. Backeberg says that each areole in the mature cephalium may carry up to 100 bristles which can be as long as 6 cm. as well as thick wool.

Examples of such mature cephalia were observed on plants grown bedded out at Stern's nursery on the Riviera, during our 1967 Cactus Tour. There were several cuttings of stems with immature cephalium being rooted up and I was fortunate enough to be able to acquire one of these, it being over two feet in height, having about 8" of cephalium. This was potted up on return home but has shown very little tendency to grow in height and has shrunk steadily in body girth in a most disheartening manner.

However, in August 1968 five buds appeared in the cephalium, quite close to the crown. The buds were covered with a silky coating of hairs of a very similar colour to the cephalium but of rather finer texture. These developed slowly and on September 21st. one bud had become noticeably larger than it was on the previous day, and during the morning green sepal tips became clearly visible for the first time. By late afternoon, with continued enlargement, the bud had become about 2.5 cm in diameter and about 5 cm long, the tube being a slow-tapered funnel-form with the mouth of the flower still completely closed by the sharply incurved tips of the petals - there being a very slight bell shape to the as-yet unopened flower.

The late afternoon was completely overcast and at 6.00 p.m., whilst some daylight still remained, the tips of the petals began to open out. By 8.00 p.m. it was quite dark and the petals had straightened out, the flower now showing a fairly even funnel form. The flower appeared to be almost full of stamens and the stigma was not exserted at that time. By 11.30 p.m. the petals had opened out fully so that the flower was now bell-shaped, the outer stamens almost reaching the end of the flower. The petals, stamens, and style were all of a deep cream

colour. By 8.00 a.m. the following morning the flower was partly closed into the funnel shape; the day being fully overcast, and the flower remained thus until about noon when it closed fully and did not reopen.

A second flower opened from the funnel form to bell shape between 8.00 p.m. and 11.00 p.m. on September 26th, being back to the funnel shape by 8.00 a.m. the following day and the inner petals were curving inwards by 9.00 a.m., closing fully soon after as the sun waxed in a fairly clear sky.

The overnight temperature in the greenhouse at that time was over 50°F. Shortly after we felt the onset of the regular Buchan's cold spell of early October and the night temperature in the greenhouse fell below 50°F. A fan heater was directed nightly at the remaining buds, one of which enlarged during the course of a fine day and reached the point of opening but subsequently failed to open, the other two buds ceasing to grow at all.

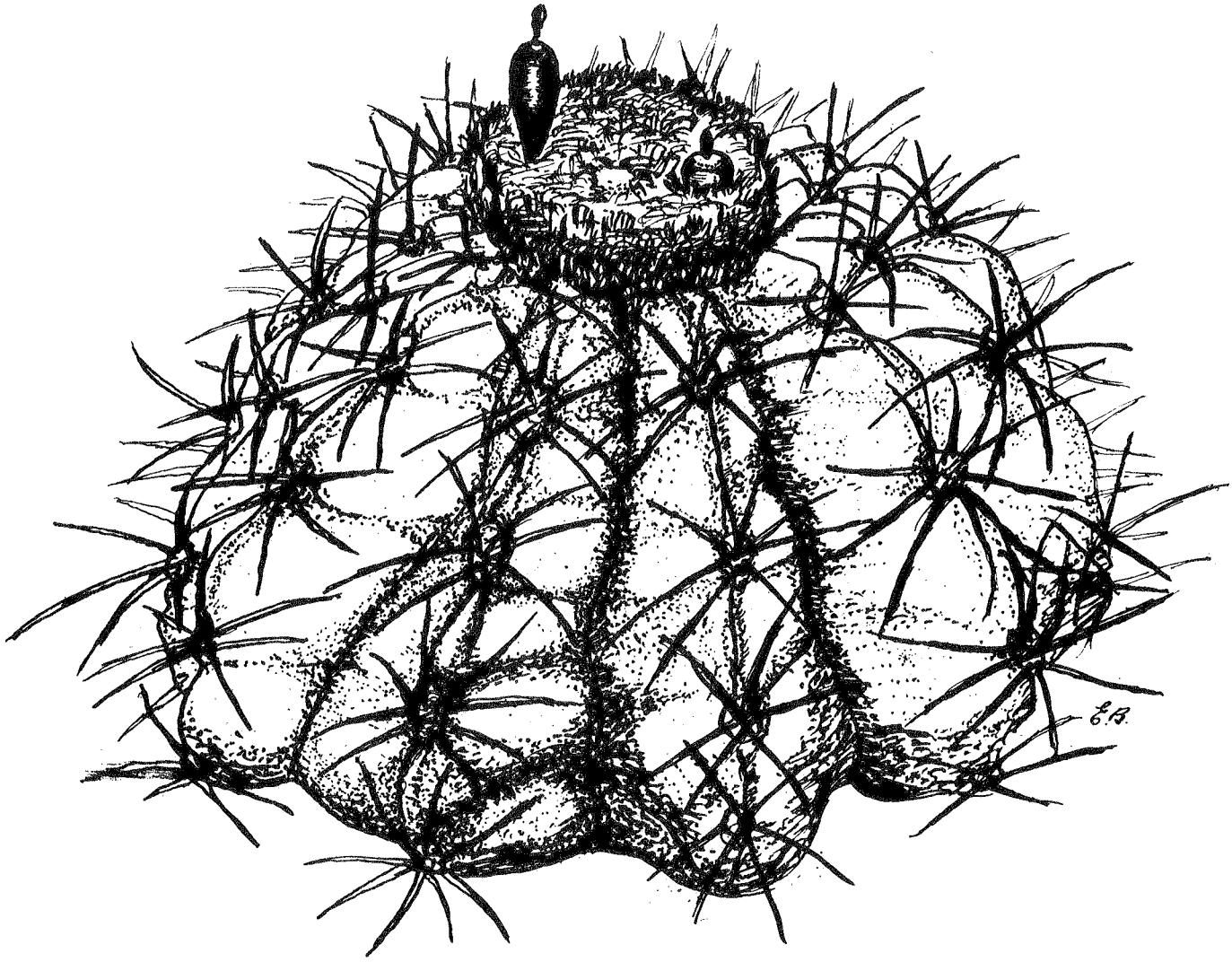
This plant is found in Bolivia at an elevation of about 3,000 ft. at latitude 19°S, where it is unlikely to encounter a temperature under 50°F - and possibly not under 60°F. It will probably be protected from the effects of the cold inflows of air which sweep northwards to the east of the Andean chain, over Argentine and the Chaco, by its sheltered valley location. It would seem from this that a temperature in excess of 50°F would suit the plant best in its growing and flowering season.

In 1959 Buxbaum proposed submerging both this genus and Thrixanthocereus into Espostoa, mainly on the grounds of a comparison of the flowers, but also having regard to the narrow differences between all three genera in other characteristics. Since the flower is a hairy one it cannot remain in Cephalocereus - Troll was apparently unaware of the flowers when he collected it. One is therefore left with the alternative of calling it Vatricania if one wishes to follow the Backeberg system of classification, or of calling it Espostoa if one prefers a system having less genera.

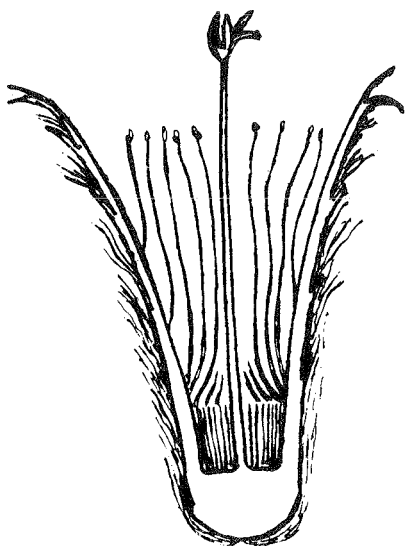
In Die Cactaceae, Backeberg was very critical of the accuracy of Buxbaum's flower cross sections. The funneliform shape recorded by Buxbaum, without any outwardly turned petals, is that which I observed when the flower was only partly open. However, Backeberg makes repeated references to the wheel shape or wide open form of the Thrixanthocereus and Espostoa flower when viewed directly into the mouth of the flower; his own illustration of a Vatricania in flower in the Andreae collection, viewed sideways, would suggest that the petal tips are almost as wide opened - perhaps a little more than I observed on my plant - but seemingly differing only slightly from Thrixanthocereus and Espostoa; hardly enough, one might have thought, to warrant consideration for generic status.

My own flower was found to have the base of the nectary chamber nearly flat, differing markedly in this respect from that illustrated by Buxbaum, although I do not know how this difference compares with the normal degree of variation of this characteristic. The nectary chamber was striated and the majority of the stamens were inserted immediately above it. The tube wall was almost 2 mm. thick at this point. The outside of the tube was covered with numerous scales each of which carried some silvery-brown silky hair in the axil.

Our readers in Australia and New Zealand may well be in the best position to compare cephalia and flowers on plants in this group. Any comments or observations would be very welcome from any quarter.



MELOCACTUS HU 132 Collection :- E.W.BARNES



FLOWER SECTION VATRICANIA GUENTHERI

L.– H. MIDDLEDITCH R. – BUXBAUM (K.u.a. S. 16 :10 p. 190)

MELOCACTUS H.U. 312 sp.n.

By E.W. Barnes

I obtained my Melocactus HU 132 from Sukaflor of Switzerland: it is 6" dia. and about 5" tall. It has been a prolific flower and fruit producing plant and I have collected 40 fruits from it during last summer. In general appearance it is somewhat like M. bahiensis and comes from Brazil, too. The seed pods are large and rose coloured, very fleshy and juicy. Their appearance is heralded by the dried floral remains, which are withdrawn to some extent after flowering. After the exsertion of the dried flower, the berry begins to emerge, being thrust out by the bristles which exert pressure on the sides of the fruit, this being tapered towards the base and slides out easily. Occasionally the fruit will be ejected with some force and hit a rib, to fall beside the plant.

The flower is very small, rose coloured, and opens in the evening. It is interesting to compare the cephalium of this plant with that of Cephalocereus brevicylindricus, as it too is 'zoned'. The bristles of the outer ring are longest, and deeper red in colour. The middle section produces flower and fruit, and the depressed central section is still in growth. The cephalium is not built up by the production of bristles with each flowering, but actually grows from the centre. A friend who lived in the West Indies for many years used to tell me that Melocacti with cristate cephaliums were highly prized for decorative purposes. This shows without doubt that growth is made from the centre, which must contain an extension of the plant body. I must say that I have never seen, nor heard of anyone who has seen a cristate Melocactus in cultivation with a cephalium, as Melocacti having their cephalia damaged usually produce small offsets each complete with equally small cephalia.

I also have a plant of Melocactus HU 137. This is a taller growing species with a wonderful dark red cephalium. It obviously produces an elongated cephalium as that of my plant - which is app. 4" diameter - has already begun to elongate even at this early stage. Flowers deep rose colour, opening in batches in the evening. Fruit pink, elongated. Many months may elapse after flowering before any fruits are produced.

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AN INTRODUCTION TO LOBIVIAS

By R.E. Hollingsbee

Lobivias have some of the most beautiful flowers of all cacti and succulents and deserve to be much more popular. There are also contrasting plant forms and some of the longest spines found in the cactus family.

The colour range of the flowers is considerable, with all shades of yellow and orange through to reds and glossy purples, and one or two isolated colour forms with greenish white or cream flowers - such as densispina v. albiflora. There are bicolours and occasionally a form with striped flowers is found. One of these is a form of L. drijveriana which is really bizarre; the petals are striped white and purple with some yellow and green as well. The exceptionally wide range of colour in the flowers of forms and varieties of species such as densispina, pentlandii and haageana, has led to the suggestion that the genus is still evolving.

Many of the plants once described as Lobivias with slightly longer than average white or reddish flowers are often classified now as Pseudolobivias and form a link with Echinopsis.

True Lobivias are said to have short-tubed day-opening flowers although some collectors are beginning to question the latter statement due to the observance of a few species in full flower early in the morning. (See also The Chileans No. 11. p.50 - H.M.) - suggesting that they have opened during the night.

Flower size varies in Lobivia and can be up to about four inches in diameter; but they are never as long as Pseudolobivia or Echinopsis. The flowers are usually funnel-form in shape; some are wide-opening, others only three-quarters open, forming a narrow trumpet. Most species are self-sterile, an exception being Lobivia (Acantholobivia) tegeleriana. The flower tube is woolly and sometimes bristly. Fruits are often very densely covered with wool but are usually without bristles. The drying pod splits down the side, sometimes splitting completely in half to reveal the brownish seeds still attached to the pod by thin white threads. These threads soon shrivel and the seeds are released.

Plants of the Lobivia group are natives of the Andean regions of Argentina, Bolivia and Peru, being found at elevations in excess of 6,000 ft (which is usually the ceiling for Echinopsis species) and as high as 15,000 ft. In Bolivia the average yearly temperature at 13,000 ft, where many Lobivia and other cacti grow, is 45°F. Temperatures may fall to as low as 15 degrees below zero centigrade. A high proportion of the cacti found here have developed exceptionally strong spines, hair, or a thick coating of strong, bristle-like spines which may act as an insulator - and what spines some of the Lobivia possess! In L. hastifera and varians they can be up to 10 cm. in length and very dense.

Lobivias are sometimes hidden in habitat by other vegetation - Lobivia shaferi for example, which is found growing in firm leaf-mould and entangled in hillside thickets (at Catamarca, Argentina), camouflaged by rocks with which they blend; or half buried in sandy soil like species of the Haageanae group. During his 1933 expedition Backeberg reported the discovery at around 13,000 ft, in Argentina, of the short-spined L. drijveriana. It was so well hidden that it was found only by accident, as it was so deeply embedded in the ground. Imported plants like L. corbula and L. westii show signs of having been deeply embedded in the ground, the lower spines being soft and spongy and coated with whitish salts.

Some imported specimens exhibit signs of having survived very moist conditions. But in winter, although they are covered with hoar frost, the soil is usually quite dry, for winter is accompanied by a drought. Ritter records that in its habitat on Mount Tunari, L. caespitosa grows in wetter conditions than any other Lobivia and is found growing amid grasses and clover, in rocky soil. It has also been reported that caespitosa sometimes bears its flowers amid a carpet of snow and that L. corbula v. elegans withstands frost at flowering time.

Vegetation can be sparse in Lobivia country and some species are liable to be attacked by hungry animals such as skunk, goats and llamas. Anchored by long tuberous roots, many Lobivias, however, do defy this foraging, for when the heads are chewed off, the base sends out new shoots and forms large clumps.

The majority of Lobivia species in cultivation are reasonably compact and require large pots only when mature specimens of some species develop large turnip-like root systems. Often a small plant may be dwarfed by its pot because of the need to house the massive root system. An example is L. backebergii. Sometimes a pot may have to be large to get the depth necessary to accommodate a tap root. Even young seedlings $\frac{1}{2}$" tall may have thick roots over 3" in length, but growers frequently keep them in small pots or trays too long so that the tap root becomes tightly twisted or even doubled up with the tip facing upwards. This can often lead to damaged, stunted or slow developing specimens. Varieties of densispina, in particular, have extensive root development.

From their high altitude habitat it follows that in cultivation Lobivias require lots of natural light and to be kept cool in winter. They come to no harm if kept quite dry from the end of October to early March. They enjoy a rich open soil - leaf mould being ideal - and need plenty of water during the growing season. Despite the extreme cold of their natural habitat Lobivias are susceptible to the damp English climate in winter and it is wise to ensure that the winter temperature in the greenhouse does not fall much below 32°F.

Buds should begin to appear (in the South of England) from mid-March onwards, flowers generally appearing a little later than on Mediolobivias and Rebutias. The length of the flowering season is much greater than that for Rebutias as a whole, and there is a less noticeable resting period in midsummer. Some species shrink noticeably in winter and take some time to fill out the following year, like L. arachnacantha. Sometimes this is delayed until quite late in the season, after the production of flowers.

All species should flower in a comparatively short time from seed and there is no reason why good spine development should not be achieved.

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COMMENTS ON LOBIVIA - from H. Middleditch

Bob Hollingsbee comments upon the relatively free flowering characteristics of Lobivia, which are familiar with their flowers in many hues, mostly with flower tubes round about 2" to 3" in length, some species having shorter flower tubes and some slightly longer.

Backeberg's genus Pseudolobivia would appear to contain a selection of genera with a fair range of characteristics. As he indicates in his 'Kakteenlexikon', there are two yellow day-flowering species, the remainder opening more or less in the evening; about half of these are white or pinky-white, and half red or pale red. Two species have flowers just as short as Lobivia and the remainder as long (or nearly so) as Echinopsis, but slimmer. It is easy to criticise this and to suggest that anything which did not quite fit in with Backeberg's view of either Lobivia or Echinopsis was conveniently relegated into Pseudolobivia; but nevertheless it is a little difficult to ascertain any feature or features characterising this genus clearly distinguishing it from Echinopsis and Lobivia.

Under Pseudolobivia we may find in Backeberg's Kakteenlexikon P. torrecillacensis, which Cardenas described originally as an Echinopsis; Backeberg includes a note to the effect that the Lobivia torrecillacensis found in Europe was not this same species, but a variety of Lobivia arachnacantha, which he also lists. Backeberg's view was based upon the Echinopsis torrecillacensis of Cardenas (Pseudolobivia torrecillacensis Bckbg) having a flower tube of about twice the length of Lobivia arachnacantha v. torrecillacensis. Between the time when that was written and the present, plants have been observed carrying both long-tubed and short-tubed flowers on different heads of the same rootstock. It is thus one and the same plant, which Backeberg placed in both Lobivia and Pseudolobivia.

The flower structure is basically similar throughout the Echinopsis - Pseudolobivia - Lobivia range and does not differ in constructional features between the many coloured, short-tubed day flowering plants we term Lobivia and the long-tubed night flowering plants we call Echinopsis. Like any plant which grows at considerable altitude, a Lobivia would probably be unable to flower at night since the temperature, being below 43°F, is too low for the plant to be active - and it would also be a waste of time as the temperature is also too low to encourage insects into active flight in search of nectar and thus to pollinate the flower.

Echinopsis is probably the only globular cactus which flowers at night - all other night flowering cacti carry their flowers on columnar or climbing stems, which puts them more or less on the right level to be in the path of a flying insect. This increases the chances of an insect observing and alighting upon the flowers. To compensate for its lowly stature, the Echinopsis has to feature sufficient allurement to attract an insect flying well above it - hence the long tube, the large flower, the white colour, and the sweet scent.

The genus Haageocereus also contains night-flowering (white) and day flowering (red) species, but being columnar there is little difference in the flower size. Whilst there was a proposal put forward at one time to divide Haageocereus into two genera, based on day or night flowering, this idea has not been accepted and even an amateur collector has very little trouble in accepting Haageocereus as one genus. However, any suggestion that the Lobivia-Pseudolobivia-Echinopsis group should be combined into one genus would undoubtedly cause controversy, although it would seem probable that it is going to be - if not already - difficult to continue to justify three separate genera on botanic grounds.

As Prof. Buxbaum wrote over ten years ago ("Cactus Culture Based on Biology") 'Lobivia is one of the most controversial genera as regards nomenclature (and) obscure as regards the compass of the genus'. From the following article by Herr Ing. Markus who has visited the Lobivia habitat on several occasions, it would appear that Buxbaum's further comment that 'Lobivia is still more obscure as regards the species' is not without support.

Bob Hollingsbee also observes that most Lobivia occur at above 6,000 ft. altitude. All along the eastern flanks of the Andes, from Peru to midwestern Argentina, this represents the upper limit of growth of hardwood trees - and southwards from central Bolivia there are very few conifers growing above this limit. The forest is thick Montana in Peru and the Bolivian Yungas, thinning and becoming less lush and more stunted the further south, but would appear to be lacking in Lobivia throughout its changing character. The front ranges of the Andes comprise a series of ridges and valleys at right angles to the rain bearing winds, so that the windward flanks carry hardwood forest and the deeper lee valleys support only stunted shrubs and grass - called 'monte' vegetation. It is in the latter situations that Lobivias are found below the 6,000 ft. line.

The comments upon the thick tap roots seem most apposite to me, for I once unpotted a Lobivia higginsiana which appeared to be rather unhappy although in a pot quite adequate in size for the plant body; the pot was almost full of a thick twisting coil of root. Now that the plant has settled into a pot more than twice the size it is much happier.

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COMMENTS FROM J.D. DONALD

Lobivia torrecillasensis exists in a multitude of forms, all from the same habitat. There are dark green bodied forms and light green bodied forms; small and large headed; small ribbed and obtuse-ribbed; dark spined and light spined forms; straight and curly spines; long-tubed flowers up to 3" long, short-tubed flowers 1-1½" long; mauve tubes, brown tubes, green and pale yellow green tubes; mauve scales or light green scales; brown hair or black hair in the axils; blood red or crimson to scarlet flowers, with spatulate or mucronate or acuminate petals. All possible combinations are now known in cultivation.

Backeberg made the error of dividing the plant into two - Pseudolobivia (Echinopsis) for the long-tubed forms and Lobivia for the short-tubed forms, both as torrecillasensis. There are separate descriptions for each in his Lexikon.

I am afraid that amateur collectors will sooner or later have to take seriously the suggestion that many Lobivia, including pentlandii are, in fact, Echinopsis. The trouble is that Lobivia is an untenable genus - the differentiating characters used by Britton and Rose are not good enough to justify Lobivia, other than as a subgenus of Echinopsis. One always thinks of Echinopsis in terms of eyriesii, oxygona, or tubiflora, with one's attention artifically fixed on the night-flowering, sweetly scented, long-tubed flowers. These are not the characters that have any real significance and certainly not the prime characters upon which Echinopsis was erected.

I admire Ing. Markus' bold concepts of what constitutes a Lobivia species and his welcome suggestion regarding the reduction in the unwieldy number of published names in this genus. He has clearly defined the range of variations to be expected with each major species population so that the latter achieves its proper botanical status as species ratus (substantiatus) and relegating the associated taxa as either synonyms or into infraspecific categories. The cultivated plants of these relegated 'species' are of course still recognisable and deserve retention in one's collection as natural variants of the parent species. The cognomen may be retained if the infra-specific category can be justified i.e. subspecies, variety, subvariety, form; but if not, then a cultivar name (cv.) should be coined to allow recognition of its uniqueness.

I note with interest the reference to L. saltensis. Has Ing. Markus rediscovered Spegazzini's mystery plant - a Lobivia with a naked flower tube? Regrettably he makes no reference to this particular characteristic.

The L. cinnabarina group from Bolivia is very important as it includes the small flowered L. pseudocinnabarina, also with a near naked flower tube, the closest Lobivioid relative of the Sulcorebutias.

Trichocereus also has a day-flowering section with coloured flowers as well as the normal white, scented, night-flowering section; for the former Backeberg created the new genus Helianthocereus. The Lobivia - Pseudolobivia - Echinopsis problem cannot be divorced from; Trichocereus. All these genera are inextricably mixed!

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HERR MARKUS - LOBIVIA SPECIALIST

Translated from the January 1969 G.O.K. Newsletter by E.W.Bentley

The original Lobivia is L. pentlandii. It was described by Hooker in 1844 as an Echinocactus. The genus Lobivia was set up in 1922 by Britton and Rose. The following are most prominent among the characters of the genus: "as far as is known, day flowering, flowers short, funnel to bell-shaped, at the sides of old areoles, sometimes near the crown, sometimes on the lower half of the plant". The range of the genus Lobivia stretches from middle Peru through Bolivia to middle Argentina. Mostly the plants grow at heights between 2500 and 4500 m. The only exceptions are the group around L. aurea (below 1700 m.) and L. arachnacantha (around 1800 m.)

The range of variation of individual species is extraordinarily large and it is scarcely possible to find two wild plants the same. Unfortunately this has lead to a large number of varieties, that, partly wittingly for commercial reasons, and partly unwittingly, have been called species and described. In what follows may I pick out only a few from the geographical ordered list of individual species of form-groups.

Furthest north grows L. tegeleriana with its forms (as for example L. oyonia, L.incuiensis, L.westii). The flower colour varies from yellow to red - L. hertrichiana with dark violet

to orange coloured flowers has a freely offsetting body. Forms of this are L. allegraina, L.planiceps, L.minuta and others.

Round about Lake Titicaca, also in S.Peru and N. Bolivia is the home of L. maximiliana, which mostly forms large clumps. Spine colour is yellow to brown, flowers three-zoned, red, bluish outside, yellow within.

South from there L. pentlandii joins up. Its range of form is very large. Not only the colour and length of spines but particularly the form and colour of the flowers (from white to dark violet) varies very much. This leads to a very large number of descriptions as, e.g. L.leucoviolacea (flowers nearly white), L.higginsiana (flower wine red), L.johnsoniana (flowers elderberry coloured) and L. schneideriana (flowers yellow).

East of the Cordilleras (mid-Bolivia) is the distribution range of L.cinnabarina and its forms. Body up to 15 cm. diameter, spines adpressed.For a long time it was missing and was found again by W. Rausch. Varieties of this species are L. waltherspielii, L. rossii and L. acanthoplegma. From the south of Bolivia comes L. tiegeliana with shiny epidermis. A hybrid of this is L. peclardiana.

From the north of Argentina comes L. longispina with strong and long spines. The flowers are white. Here also again several species as e.g. L.kupperiana (flowers yellow to red), L.hystrix and many others have been described.

The main connecting route from Bolivia to Argentina goes through the valley of Humahuaca. In the northern part of this valley grows L. rubescens (syn. L. haageana). Flowers yellow to red, red throat. Adjacent, to the south, grows L. jajoiana. The type has red flowers and a black throat. To its varieties belong L. vatteri (flowers yellow to red, black throat), also L. fleischeriana. In the same distribution area grows also L.densispina (flowers yellow to red) with its varieties. To these belongs L.pectinifera, which is often designated as L. famatimensis. However it has nothing to do with the true "Echinocactus famatimensis" which clearly seems to be no Lobivia, but rather a Neochilenia. Here belongs also L.rebutioides with white to violet flowers.

South of the valley of Humahuaca is the second large distribution area of the Salta Province. There grows the similarly form-rich species, L.chrysacantha. Synonymous with it, among others, are L.staffenii, L.polaskiana and L.hossei. The flower colour varies from citron-yellow to orange, red throat. The plants are regarded as delicacies by the local people.

In the neighbourhood of Cachi grows L.haematantha with orange to red flowers. For a long time this species was missing. To it belongs as a variety L.drijveriana, and not, as is usually stated, the other way round. Furthermore here also belongs as a variety, L.elongata. The plants grow at about 3500 m. on dry scree slopes and in winter are deeply snowed up at temperatures down to -15C.

South of Salta is the distribution area of L. saltensis and its varieties with exclusively red flowers. In the most southerly part of the distribution area (from Salta through Catamarca to Cordoba) grows L.aurea with its varieties at the unusual height, for Lobivias, of 800 to 1200 m. All have the yellow flower colour in common. However they differ in habit. In this group may be numbered L. fallax, L.leucomalla and L.shaferi.

To conclude Herr Markus showed us some pictures from his collection to illustrate the foregoing remarks. By means of the fine pictures he showed plainly the great variability of this genus and how useless it is for example to say "flowers red". Virtually always it must be

"from ..... to .....". The same goes for the habit and flower size, which likewise can vary from one to two times. (Many of the habitat locations referred to in this article may be found on the map on the front cover. A description of this habitat appears under the article on Mediolobivia, Chileans No.12. pp.86 - 87).

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NOTOCACTUS RAUSCHII van Vliet sp.nov.

By D.J. van Vliet

Translated from Succulenta for January 1969 by H.Middleditch.

Plants solitary, globular or slightly elongated, up to 16 cm. diameter and up to 21 cm. high, blue green, crown covered with wool and with roofed-over spines. Ribs 20-28, made up of chin-shaped humps which are up to 8 mm. long and 5 mm high, between which are placed the areoles; areoles up to 8 mm from each other and up to 3 mm in diameter, round and felted, later becoming bald. Spines needle-like and sharp, the radials up to 15 in number, up to 8 mm long, starlike distribution, white to pale rose, the central spines 1 to 4 in number, now and then difficult to distinguish from the radial spines, up to 22 mm long, the youngest black with red base, later pointed downwards and paling to light rose; spines now and then also yellow to brown.

Flowers funneliform, up to 3.5 cm. high and 5 cm. diameter, close packed round the crown; ovary and tube covered respectively with thick white and light brown wool, scales invisible, tube long, the upper part carrying some brown bristle-like hairs; outer petals lanceolate now and then crenate, shiny citron yellow with purple midstripe, the innermost petals lancet - to spatula - shaped, crenate and glossy citron yellow: stamens inserted over the entire length of the flower tube, forming a small nectar chamber at the base of the style; filaments light orange yellow with yellow anthers; stigma light yellow projecting above the open flower with 10 purple-red lobes (11 lobes quoted in the accompanying latin diagnosis - H.M.)

Fruit elongated, thin walled, green and covered with white wool, splitting open vertically during drying, holding ± 75 seeds; seeds bell-shaped, the skin covered with black humps, hilum dirty white, a little concave and offset (?), now and then slightly wavy.

The plants grow in the Cuchilla Negra, Department Rivera, in Uruguay on dry, sunny places on the tops of hills of about 300 m high (app. 1,000 ft. altitude) especially in crevices in rocks in which some humus has collected. They grow together with Wigginsia (Malacocarpus) sellowii, Notocactus ottonis, megapotamicus, N.mammulosus, N.herteri, N.caespitosus, and Frailea pygmaea. This species was found by Herr Rausch during our joint expedition in Uruguay and carries my field number D.V.34. It is a strikingly handsome species, which is to be compared with no single known Notocactus other than perhaps with N.mueller-melchersii, but differs from that species in that the spines are not so stiff and sharp; moreover, N.mueller-melchersii belongs to the flower-form of the 'mammulosus-group' whereas the flower form, the fruit and the seeds of N.rauschii have many resemblances with those of N.scopa, differing from this however by the young black spines in the crown.

From time to time things occur of which one has a presentiment. In Rivera we had met Herren Buining and Horst. There can be little dispute that this could be called a marvel, in this vast countryside. When people have agreed anything like this, how easily it miscarries. For a whole week we met each other each evening and discussed during the meal the successes

or setbacks of the day. On the last evening of our get-together these two related everything with which they were acquainted and had found throughout the extent of Rivera. We had found more there ourselves and it was our intention to leave after two more days, but first we had still to clean our collected plants.

The following morning it was fine again and we resolved to make yet one more outing, hoping to find one further 'white spot' in these parts and encouraged by our premonition we set off. After two hours cycling over a very poor country road, there appeared at one side some rock formations. We investigated these, but found nothing to awaken interest. However we decided to penetrate deeper into the area. After having got our provisions from the cycles, we went on for about an hour and came upon a sort of plateau, where rocks frequently protruded above grass and fields. We moved away from each other to increase the chances of a find. After some hundreds of metres Rausch gave an enormous shout which, so it shortly appeared, not only alerted me but also a farmer working farther away. I ran for the 'disaster' spot and saw about 15 metres away the pale pink balls gleaming in the spring sun, whilst the young black spines on the crown made for a pretty contrast. We knelt down before this natural marvel, when an angry farmer came quickly running, wielding his pickaxe. After he had heard what we were about, he changed his attitude. The people here are friendly and hospitable and thus before long he gestured towards his residence on his property. The plants stood there in bud in abundance. We counted as far as 23 buds standing in various rings in the crown. There were no flowering plants to be found so we resolved that during our further travels to place in the sun as much as possible the plant with the most developed buds. Our action was rewarded after two weeks, in Tacuarembo. Now we could cross-section and study the flower. During these activities the stamens themselves moved in towards the stigma. This phenomena occurs also, as far as I know, in Notocactus ottonis as well as N.scopa and some Wigginsia (Malacocarpus). Occasional plants carried some remnants of fruit, where here and there were a seed left behind after the ants had taken away the major portion. A single fruit was still entirely complete with seeds, this alone supplied us with sufficient material and more is to be said about this later.

The plants which we uprooted offered strong resistance from their branching roots in the rock crevices - strong resistance in contrast with others which grew on the rock faces and which we could easily pick up on account of their horizontally spreading roots. The plants were often accompanied by a patch of moss, in which Iris-like bulbs were often set.

It goes without saying that each of us filled a rucksack with these plants which gave us not only their added load, but above all a very satisfied feeling.

SOUTH AMERICAN EXPEDITION 1968 - PART 1: URUGUAY

A slide lecture by Walter Rausch, reported in the January 1969 G.O.K. Newsletter.

Translated by E.W.Bentley

Herr Rausch this time had a Dutch travelling companion, Herr D.J.Van Vliet. His 10-month journey led across Uruguay via Argentina to Bolivia.

In Uruguay, where the mountains are not so sky-high, two bikes were obtained with which they did round about 2000 Km in the course of 3 months. In front of each bike was a small box to contain collected booty. On the luggage carrier was a ruck-sack with air-mattress, sleeping bag, provisions, photo-equipment etc. This arrangement proved itself - only many times it happened that the road disappeared in the bed of a stream, then it was a case of:

down from the bikes and struggle through mud and waist-high water.

On the journeys to the cactus places they met only a few people, instead, South American ostriches (rheas), and snakes in all sizes and colours.

Uruguay is a hilly, fairly low-lying land (the highest mountain is 501 m. high) whose wide grassy plains are grazed by millions of sheep (they are the greatest cactus foes!). The cacti often stand deep in the grass; however, preferred situations are rocky places. Notable in Uruguayan cacti is the fact that they flower at the end of the rainy period when their bodies are plump and juicy. In contrast, the high Andean cacti produce their flowers as the first signs of life towards the end of the dry season. In the meadows flowers bloom that in their brilliance remind one of our alpine plants; various small bulbs - Iris species reminiscent of our Iris pumila; Oxalis which occurs in several species: and a yellow flowering clover.

From the grass shine the first cactus flowers: Gymnocalycium uruguayense. When not flowering the plants are buried in the grass and cannot be found. The species is distributed through the whole of Uruguay, their flowers are lighter or darker yellow, exceptionally brownish, their bodies thick or sparsely be-spined, the spines fine or stronger. All forms can be met with mixed together at all localities. Similarly mixed and distributed throughout Uruguay is the variably spined Malacocarpus which in Europe has acquired up to 15 species names (M.erinaceus, corynodes, sessiliflorus, sellowii etc.). Plants with more or less spreading longer or shorter spines are associated in a single locality (one of which shows only 3 longer spines). Malacocarpus arechavaletai is confined to a restricted area and presents a uniform picture with its rigid middle (usually one) spines. Frailea pygmaea with its close-lying spines in varying colours, in thick clumps wreathed around a block of primeval rock. F.pumila is somewhat thicker and beset with curled, yellowish spines. In their habitat Notocactus concinnus, apricus and tabularis are very variable in colour and number of spines. They are widely distributed, particular forms often confined to a small area. Their relationship to one another need clarification. N.ottonis too is widely spread in many forms; very beautiful is a form with long colourful spines (var. tortuosus). In one locality, among variable type plants, occurred a few specimens that stay definitely smaller and are shorter and black spined: no transition forms are to be observed: probably a good variety. A picture was obtained of a more than head-sized N.megapotamicus. Also the group around Notocactus mammulosus exhibits many forms and is distributed throughout Uruguay. Near Piriapolis for example one finds N. mammulosus, N. submammulosus (with somewhat more open spination) and N.velenovskyi together in the same locality. N.mueller-melchersii occurs in various spine colours at one spot: the longer or shorter, yellow, brown or black centre spines stand out from the more or less thick white of the outer spines. N.scopa grows mostly on rocky ground and is never encountered in meadows. It occurs in longer or shorter spined forms, with or without a pronounced centre spine, in colour varying from white to red. N.herteri one finds mostly in the valleys in the shade of bushes. It becomes up to headsized. N.werdermannianus up to the present is not met with in European collections.

N. caespitosus (minimus) exhibits tap-root runners (like the potato), from which new plants emerge. In this species occur groups of many heads.

Herr Rausch has taken many astonishing pictures with his camera. Unforgettable to me is a shot of a flowering Passiflora twining round the stem of a Cereus peruvianus; in another picture a bird has built its nest in the impressive, shrub-like, growing branches of Cereus peruvianus; or Tillandsias, which are mostly only found on trees, colonising a Cereus. On one tree a whole botanical garden has been collected together, a single branch of which could be regarded by us as a splendid "Epiphyte tree": on lichen encrusted stems and branches sit Rhipsalis, Tillandsias and bromeliads of various species. One bromeliad species, a geophyte, has flower buds that look like snake-heads.

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COMMENTS FROM H. MIDDLEDITCH

At first one tends to be taken aback by the rather broad statement that we are liable to see about fifteen species of Malacocarpus (Wigginsia) all rolled into one, especially when this includes the more well-known species like erinaceus and corynodes. The all-embracing extent of the suggestion becomes even more apparent when one refers to Backeberg's Die Kakteen-lexicon and finds that there are only sixteen species of Malacocarpus listed there.

On reflection, however, one might feel more able to concede the logic of the idea. It is over ten years since Buxbaum wrote, in his 'Cactus Culture Based on Biology' - "Many of the species (of Malacocarpus) should be regarded as varieties only, for the species are very variable".

Of the species named by Rausch, I possess plants of erinaceus, corynodes, sellowii and of tephracanthus (which Backeberg gives as synonymous with sellowii). All have between five and eight radial spines, flattened, radiating mainly sideways and downwards, horn to grey in colour; and with 16 sharply cleft ribs. At first sight the tephracanthus does not appear to have a central spine, until one sees that it is strongly downpointing and laid over a weaker radial spine. There is far less variation between these plants than there has been reported and illustrated in, for example, Gymnocalycium spegazzinii.

Contrary to the impression I had acquired when growing only one or two small plants of this genus, I now find that plants larger than about $2\frac{1}{2}$ to 3 inches in size flower quite readily.

COMMENTS FROM K. HALSTEAD

Almost the same thought entered my mind when I read of fifteen species of Malacocarpus being rolled in to one. On thinking this over, the probabilities are perhaps not so strange. My own plants of corynodes, ernestii, fricii, sellowi, tephracanthus and vorwerkianus are very similar but erinaceus appears to be different from corynodes; on the other hand, tephracanthus and macracanthus in my collection are very much the same as erinaceus.

At one time corynodes and erinaceus were grouped together by Britton and Rose, and according to these two American experts tephracanthus had the following synonyms: Malacocarpus sellowi, M. tetracanthus, M. martini, E. sessiflorus, E.fricii, E. pauciareolatus, E.sellowi macrocanthus; whilst erinaceus had the synonyms M. corynodes, M.leucocarpus. This takes care of ten of the separate species in Backeberg which were previously allied, leaving only langsdorfii, arechavaletai, kovaricii, macrogonus, stegmanii, turbinatus and vorwerkianus. The first two are typically different from the others: the next four I have not seen yet and finally vorwerkianus seems to me to be similar to the tephracanthus-sellowi group.

I should very much like to resolve the relationship between Notocactus velenowskyi and N. floricomus. The former is reputed to be a variety of the latter, yet seems to me to be quite different. I am informed that floricomus is of the mammulosus group, but my imported velenowskyi (which came from Uebelmann - a reliable source one would have though) is more like N. tabularis.

The remark about the need for clarification of the relationship between tabularis, concinnus and apricus has now been repeated numerous times. To me, tabularis seems more constant and easily recognisable with its glassy white spination, whereas apricus is more variable.

Comments and observations on the flowers, fruit, or seeds of Notocactus or Malacocarpus will be welcome and especially comments on the habit and cultivation of the newer Notocacti.

H.M.

LINZ BOTANIC GARDEN

Translated from the January 1969 G.O.K. Newsletter by E.W. Bentley

Herr Obergartner Stefan Schatzl talked about his recently concluded tour of Munster, Bonn, Frankfurt and Heidelburg. It concerned visits to the botanic gardens there. Especially interesting was his news about the palm garden at Frankfurt which is under new management and undergoing reconstruction at considerable expense; it promises to become one of the first and largest botanic gardens in Central Europe. No less significant were his remarks on the Botanic Garden of the University of Heidelberg which, under the direction of Professor W. Rauh, has developed into the central point of research and preservation of succulent plants and also Tillandsias. This garden today is probably pre-eminent among other gardens in the world in its abundance and cultivation of rare plants of these two groups. Herr Schatzl's holiday journeys have brought valuable additions to the Linz Botanic Garden, in which extremely rare and therefore valuable specimens can be seen in natural surroundings and be admired.

Herr Schatzl produced and discussed a number of plants acquired from this year's expedition by Herr Walter Rausch. A Gymnocalycium sp. 350 from Uruguay, with its yellow flowers belongs to the group of G.artigas-netrelianum-leeanum and hyptiacanthum-citriflorum. The plants under the field number 350/1 correspond with G. artigas are already here. Plants labelled No. 350/2 and 3 have a dark green, flat-rounded body with according to the size of the plant 10 to 12 flat ribs, roundish areoles, white-woolly, later grey-woolly crown, 6-9 outer spines, reddish at the base, curved, and lying on the body - no middle spine however. These plants must be Gymn. leeanum var. netrelianum.

From Maldonado in Uruguay comes Notocactus floricomus v. velenovskyi Krainz 1947 (N. velenovskyi Fric ex Backbg. 1935). Of the 8 plants that came in under this designation only one agreed with the description. All the others correspond more or less with N.mammulosus or N. floricomus. Also from Uruguay came Notocactus werdermannianus Herter 1942. Body light green, shiny, slender below, broader above. Ribs 22 running obliquely, humped beneath the areoles. The crown, overtopped with spines is sunken in, as are the small areoles. The 10-14 outer spines are needle-like, more or less flat-lying, light white to yellowish. Of the 2-3 centre spines the lowest is the longest (2 cm.). In the crown they are dark brown, becoming lighter downwards, hardly sharp-pointed. Flowers not known yet.

A very interesting novelty found by Herr Rausch is Notocactus rauschii: body light green, longish to round. The 22-27 ribs run straight and bear small humps under the areoles. The crown is white woolly and topped with strong, black centre spines. The whitish, round 3-5 mm. apart areoles bear 15-18 light horn-coloured, needle-like, side-ways directed outer spines and 2-4 centre spines of which the strongest is directed downwards. They are long and black in the crown and shorter and light grey at the sides. (Do they get shorter with age, then? E.W. B.). Another novelty found by Herr Rausch is Notocactus allosiphon, which indeed has a certain resemblance to N. mammulosus. The body is flat-round, dark green. The crown is sunken, topped with spines. The strongly formed ribs run straight down to the base of the body. Under the areoles they bear strong humps. The roundish areoles are sunken, 1.5 to 2 cm. apart and white woolly only in the neighbourhood of the crown. The 8-9 needle-like whitish sideways directed outer spines are 0.5 to 1.5 cm. long. Centre spines 1-3, the lower, longer, lies obliquely downwards and is flattened. In the crown brownish, below light horn-coloured. Flowers and place of occurrence not known to-date.

Herr Schatzl then gave a brief review of the new acquisitions of the Type Collection of the Linz Botanic Garden without exception imported plants from habitat. For 1968 the total is 171 plants, including 56 Gymnocalyciums (G. oenanthemum, leptanthum, ragonesii, denudatum, pentacantha, millarensis, gibbosum, artigas, also leeanum var. netrelianum R 350/1 - 3); 81 Notocacti (fuscus, intertextus from the ottonis group, muricatus, rechensis, minimus,

concinnus, tabularis, werdermannianus, floricomus var. velenovskyi, allosiphon, rauschii, herteri); 14 Wigginsia (Malacocarpus) - W.arechavaletai, prolifera, horstii); 12 Fraileas (pumila, pygmaea, cataphracta, sp. Nuova Italia); 31 Parodias (culpinensis, rosea-alba, dichroantha, yamparaezi, red-flowering spec. Rausch, tuberculata, schwebsiana v. applanata); 10 Weingartias (cintiensis, westii, platygona from the neumanniana group, multispina - neocumingii group).

Among the year's valuable imports may be numbered also the cephalium bearers collected by and obtained from Herr Uebelmann: Coleocephalocereus fluminensis, C. pachystele, C.brevicylindricus, C. aureus, Micranthocereus lehmannianus, Arrojadoa rhodantha and forms. Cephalocereus fluminensis Backbg. belongs to the longest known cephalium bearers. It was already described in 1825 as Cactus melocactus, but not properly studied by the older authors so that the name was frequently altered. Miquel called it Cereus fluminensis in 1838, then he created the name Pilocereus vellozoi. Karl Schumann introduced it first as Cephalocereus melocactus, then as Pilocereus melocactus, Berger as Cereus melocactus and Britton and Rose as Cephalocereus fluminensis. This species is fairly common on the militarily restricted, inaccessible 'Sugarloaf' also on the 'false sugarloaf' near Rio de Janeiro, but is difficult to cultivate and therefore scarcely ever met in collections. Professor Werdermann recognises the special position of this species ("Brazil and its Cylindrical Cacti"). In his key he wrote: "cephalium sunken in a single more or less crevice like furrow; plant scantily spined. The cephalium cushion is placed fairly high near the crown, later sinks further and further in. The ribs curve in more and more, also approaching one another longitudinally. Espostoa and Coleocephalocereus thereby exhibit the same typical character of a grooved cephalium". Espostoa has neither bristles nor spines in the cephalium. Coleocephalocereus in contrast has a cephalium strongly sown with bristles.

The plants of Coleoceph. fluminensis obtained from Uebelmann this summer flowered after two months' growth in the Botanic Garden. Like all cephalium bearers the flowers developed remarkably quickly during the night. Already by early morning the flower is withered. The flower is ca. 5 cm. large and sits deep in the cephalium. In a specimen terminal cutting of Coleocephalocereus pachystele that Herr Schatzl obtained at this year's 'Bodensee' day from Herr Uebelmann a flower appeared but when discovered in the early morning it had already wilted. Coleocephalocereus aureus and brevicylindricus are assiduous bloomers. They flowered until late in the autumn, also when grown in frames. Herr Schatzl kindly showed a series of slides of flowering Coleocephalocereus and Arrojadoa that he had snapped in the Linz Botanic Garden. These were quite rare shots, for very few collectors or botanic gardens have these plants, not to mention that they were also flowering.

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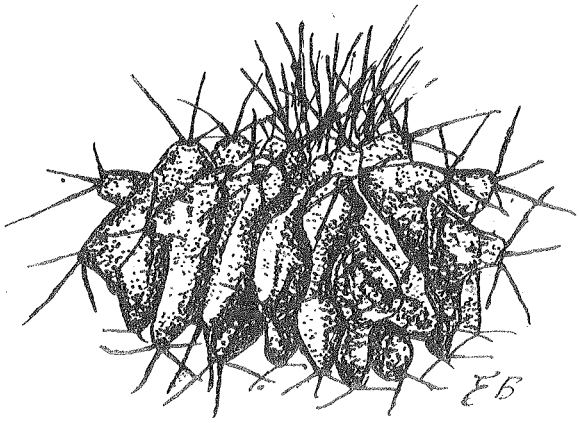
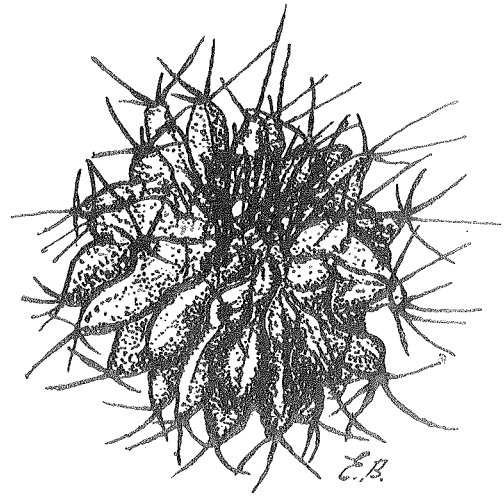
UEBELMANNIA MENINENSIS BUINING SPEC. NOVA. by A.F.H. Buining

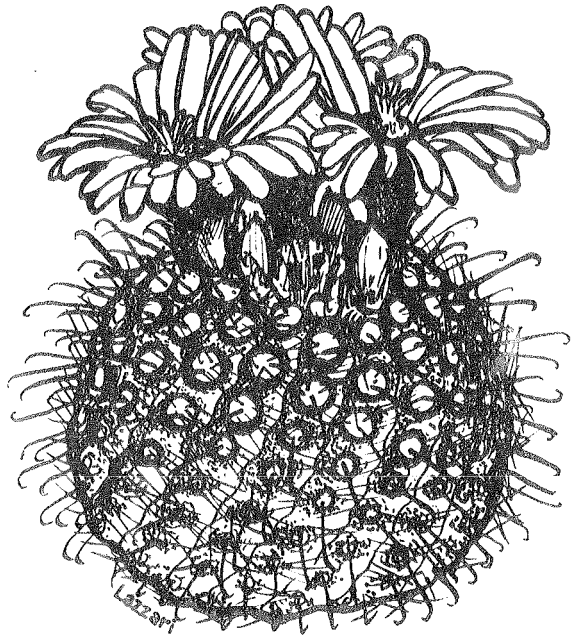
Translated by K. Wood-Allun from K.u.a.S. August 1968

Different from Uebelmannia gummifera (Backbg et Voll) Buining as follows: Up to 50 cm. long, up to 10 cm. in diameter: up to 40 ribs with completely protruding tubercles which are not pressed against each other nor partly merged with the ribs and which are up to 8 mm. high with 5-10 mm. between each tubercle. 2 spines, rarely more, one directed upwards and one downwards, up to 2 cm. long, the rare secondary spines smaller but never as small as in gummifera, young spines dark blackish brown, later dark grey. Seed up to double the size of gummifera. Habitat mountain slopes in the middle of Minas Gerais. The plant grows there in a mass on an isolated slope in pure white quarzite, near to Pedra Menina, between thorny bushes in full sun. Many bushes bear pretty tube-like flowers around which many wonderfully coloured humming birds were flying.





UEBELMANNIA MENINENSIS - Collection- E.W. BARNES



Parodia Sanguiniflora

Two thirds actual size - artist's collection

It was on December 3rd 1966 - a very hot and sunny day - when we came upon the plants after hours of walking and climbing. Determining and photographing the species was severely hindered by hundreds of so-called 'sweat bees' which were only a few millimeters long. At any rate they attacked my damp face and stung me violently in the ears, nose, eyes and the corner of my mouth, and the sting was worse than that of a bee. Since I wanted to work I had to grit my teeth and let the little devils get on with their stinging. The habitat is very isolated and the thousands of plants growing there are all alike, as are exceptional examples of U. gummifera which occur in several places in the area. I am therefore of the opinion that I am justified in describing this plant as a separate species.

UEBELMANNIA HABITAT

By H. Middleditch

Together with the other species of Uebelmannia described recently, U.meninensis comes from the highlands of central Minas Gerais state in Brazil.

To the south of these central highlands is the foremost agricultural region of Brazil, stretching from the coast to the River Parana, covering most of the states of Sao Paulo and Parana. This region has an equitable climate without either excessively hot or cold temperatures and with a rainfall in excess of 60" spread fairly evenly throughout the year. The soil is of good quality which originally maintained a thick covering of semi-deciduous subtropical forest.

To the north of these central highlands is the extensive basin of the River Francisco, some 250 miles across between its watershed with adjacent rivers; this basin is hot and dry, for the most part with poor soils which support only a sparse xerophytic vegetation. This basin has less than 40" of rain per year of which by far the greatest part falls in summer.

The central highlands of Minas Gerais thus stand at the transition between these two extensive climatic regions, enjoying a rainfall almost as plentiful as the region to the south, but almost as unevenly distributed throughout the year as the dry region to the north. The poor winter rainfall may be largely accounted for by the stability of the high-pressure anti-cyclone which sits over the Brazilian highlands and adjacent Atlantic during the winter months (May to September). The effect of the dry, descending air associated with this anti-cyclone is felt over the whole of north-east Brazil, including most of Minas Gerais, in mid-winter; the northward thrusts of cool polar air which bring the "friagem" winds and rains to Brazil, are deflected by the anti-cyclone from crossing the Brazilian highlands, to paths which follow the lower lands of the Chaco and Beni into the upper Amazon basin, or along the Atlantic coast under the warm air. In consequence, the central highlands of Minas Gerais receive less than 1" of rain during the month of July.

In midsummer the anti-cyclone retreats into the Atlantic, covering only the very north-east tip of Brazil, so that the northward thrusts of polar air meet the warm moist trade winds sweeping south across the Amazon and as far as eastern Brazil. The resultant downpour can be tremendous - such as the torrential summer thunderstorms to which Mhr. Buining refers in his notes on U. pectinifera in the December 1967 N.C. & S.S. Journal.

The surface strata here are largely composed of very ancient crystalline rocks in which minerals abound; where igneous rocks have weathered a good soil is formed. There are other rocks here which are resistant to weathering and amongst these are the quartzites in which this species was found and photographed by Mhr. Buining. The whitish semi-transparent quartz

crystals of this region appear frequently in geology books as they are probably the finest examples of the type in the world. These crystals are six-sided terminating in a six sided pyramid at each end; they occasionally occur about 3" long and nearly 1" thick, more commonly being found at about half this size. At places these crystals form the surface cover for many yards in each direction and apparently for several feet in depth. One can understand Mhr. Buining observing that one had to walk with care on these beds of quartz crystals since a fair size crystal pointing upwards might well penetrate a leather boot.

The Uebelmannia meninensis growing in this material must find the drainage phenomenal; one can thus understand how it exists with a total rainfall in the month of January only equalled by the Coastal jungles of West Colombia and Recife, the Amazon jungle, and the epiphyte drooping forests of the eastern Andean Montana and the escarpment heights of Sao Paulo.

This region is outside the northernmost limit of night frosts, day temperature being 72° in summer and 62° in winter, the average height of 3,000 ft. ameliorating the sub-tropical climate.

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COMMENTS FROM J.D. DONALD

This species was originally collected under the field number HU 113 and was thought to be Parodia gummifera Bkbg. & Voll. and was distributed commercially under this name. Later the true U. gummifera was rediscovered nearby and distributed as HU. 113A.

The chief difference is in the size of the two plants - U. gummifera HU 113A is in all characteristics less than half the size of U. meninensis HU 113 - this is particularly noticeable in the tubercle size. U. meninensis, like U. buiningii, lacks the gum cells characteristic of U. gummifera.

	U. meninensis	U. gummifera	U. buiningii
Tubercles	Large	Small	Large
Epidermis	Green	Green	Chocolate Brown
Average number of spines per areole	2	4	4
Maximum number of spines per areole	4	6	8
Seeds	Large	Small	Large

On U. meninensis the two vertical spines are about twice the length of those on U. gummifera; the comparative spine formation will be found illustrated on p.3 of the N.C. & S.S. Journal for March 1968.

The photograph on p.2 of The Chileans No. 8 is in fact of a plant of U. meninensis - not doubt acquired by the Jardin Exotique at the time this species was being offered under the incorrect name of U. gummifera.

. . . . . and from E.W. Barnes

My plants of Uebelmannia acquired last year have made roots and grown during the winter. U. pectinifera seems to need more moisture than the others and is liable to shrinkage if kept too dry. My plant receives water once a week all through the winter - although I must add that heat is provided beneath the staging and this dries the compost out rather rapidly. U. meninensis has started into growth quite suddenly but U. buiningii seems to be slower.

I note John Donald's comment that U. buiningii and meninensis lack the gum cells near the surface, characteristic in U. gummifera. I have grafted collected plants of all four Uebelmannias and only found the gum cells absent in pectinifera. As this was a very small specimen I am not too certain that they are absent even in this species. Certainly they are present in HU 141 and I experienced great difficulty in removing the gummy secretions from my grafting knife. Eventually I had to wash it in hot water. As a matter of interest, grafting hardly enhances growth in these species and apart from them being somewhat easier to handle as grafted plants, this practice has little to recommend it in this case. All my present plants are rooted specimens.

My Uebelmannia buiningii flowered last June but unfortunately I did not see it out. However, seed was set - I sowed some myself and now have a few tiny seedlings. I am rather surprised that my plant flowered since it is really rather small, but it has the apical tuft of woolly hairs, characteristic of flowering age plants.

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WHERE DO WE GO FROM HERE ?

Translated by J. Jelinek from "Kaktusky" (Czechoslovakia) by D. W. Haigh.

In our collections we often find Parodias under such names as P. erythrantha, sanguiniflora and rubriflora; what are generally known as the red-flowering species. Cactus-growers disagree about their respective descriptions and the available literature is either inconsistent or so brief that it is impossible at first glance to distinguish the plants by it.

Chronologically the first mention in literature is of P. erythrantha (formerly Echinocactus), which Spegazzini even considers as a variety of P. microsperma (I think rightly so) and as closely related to P. macrancistra. He says: "Echinocactus microspermus var. erythranthus has large orange flowers, whose petals are more pointed (than P. microsperma's), often toothed; the stamens are purple." In later writings C. Backeberg describes the colour of the flower as brick-red, the flower 3 cm. across, the stamens as red (not purple), areoles without wool and small. He gives it 20 radial spines, white and bristly and matted. The 4 central ones, arranged in a cross, are white, tipped with red, thin, and one of them hooked. So the original description and Backeberg's differ only in their view of the colour of the flower and stamen. To the layman the plant appears green (i.e. not much affected by the colour of the spines); only at the top, where the spines are thickest, does it perhaps appear somewhat more colourful, and then rust-coloured rather than red.

So that is the first example of a red-flowered Parodia, though it isn't red in the proper sense of the word. The second and third - chronologically, come from the same author - A.V. Fric - who probably found them on the same site, perhaps one higher and one lower (similarly to P. aureispina and P. aureihamata). We know that this collector was not too particular about the accuracy of the expressions he used nor about accurate evidence, and

so we must also take his description of both plants with a pinch of salt. But one thing is certain, and it has been confirmed by Mr. Kreuzinger, Fric's partner, who some time ago lent me his "Blatter fur Kakteenforschung" for the years 1934-1938: seeing the photograph of P. sanguiniflora, Fric remarked that it was identical with his own. So it can be surmised that P. sanguiniflora Fric is identical with Backeberg's. If we look into Backeberg's contemporary "Bildkatalog 1934", which contains pictures of plants found in the years 1928, 1929, 1931 and 1935 (page 11, fig. 945 - P. sanguiniflora) and Kreuzinger's "revision" of 1935 (page 24, fig. 492 - Microspermia sanguiniflora) we must confirm that they are one and the same plant. Backeberg's note "blutrote Blute - blood red flowers, white bristles, dark hooked spines" and Fric's note "silky blood-red flower, with lengthening petals (the petals grow)" agree. So we can conclude that sanguiniflora Fric ex Backbg. is flattish when young, globular to elongated when older, 5 cm in diameter, with white woolly areoles. The radial spines are bristly, not very numerous (about 15), 6 to 8 mm long; the central spines are in a cross shape, distinctly brown to carmine in colour, the lower one is hooked and longer (about 2 cm.) The flower is blood red, silky, the tube long and slim, with narrow lanceolate scales with a faint stripe, without a final spur. The stamens are clear yellow, orange towards the anther, the lateral anthers whitish yellow, the stigma thick and whitish. The surface of the tube is fiery yellow, transparent, the throat darker than the edge. The overall impression one gets, even the layman, is of a very spiny plant, whitish (because of the wool on the areoles), with distinct reddish-brown spines, which give the plant a reddish tinge (carmine), especially at the top. The conspicuous blood-red carmine colour of the flower becomes darker towards the throat. The buds are yellow, pointed, covered in whitish or brownish wool. The ovary is covered in scales tipped with carmine-brown bristles or hairs. After two or three days the flower appears untidy, as if disordered by the wind.

So thus far there's nothing to lead the cactus-lover astray in identifying plants: P. erythrantha is rust-coloured with a light flower, P. sanguiniflora is red, thicker, with a blood-red flower without spurs on the petals. Of course Kreuzinger in his "revision" gives one more plant, and publishes its picture on page 25 (fig. 489) with the description rubriflora Fric. In a note he gives it "ziegelrote Bluten - brick red flowers". Admittedly the plant is a grafted one, but even if we have to take into account the possible influence of the stock, it still looks quite like P. sanguiniflora. Only the small spherical flower buds wrapped in white wool do not suggest it. These plants are represented in our collections, and it can be said that - even though their stems are in no way different - the difference in the flowers is noticeable. Both of the former have flowers with a long, slim tube, the petals irregularly spread, lanceolate, fringed at the ends, while P. rubriflora Fric has a short, wide tube, passing abruptly into a wide open flower; the petals in the shape of an upside down drop of water, tidily arranged in a circular flower, give the impression of doubleness. The petals are smooth and divide only slightly as the flower fades, but their shape always remains rounded - never pointed. The stamens are carmine, the anthers long, cream-coloured, and the stigma the same colour. The flowers are never brick red: the colour can fade if exposed to excessive sunlight, but it remains carmine red. Mr. Venclu of Liberec has cultivated this Parodia for a long time, and out of his many sowings one could choose intensely red ones, even ones with a violet bloom on the petals (especially when fully out), or just plain red ones, but there were never any brick red ones.

So what is there to say in conclusion? The stems of P. sanguiniflora and rubriflora are indistinguishable - the number of spines, colour and shape are the same. All plants more than ten years old grow columnar. So the distinguishing factor remains merely the shape of the petals, the length of the flower tube and the colour of the stamens. Of course both Mr. Rausch and Mr. Hoomann have informed us that such variability is common in their native habitat. From their experience and my own I think it unnecessary to consider P. rubriflora as an independent species, but only as a variety of P. sanguiniflora or merely a short-tubed form. I have a strong suspicion that these two varieties have been crossed in our collections,

and so we meet "rubrifloras" with a long tube and rounded petals, and "sanguinifloras" with a short tube and brick red flowers. It will need many sowings and selections to get back to plants resembling those illustrated as the originals in Backeberg's and Kreuzinger's price-lists.

Another variety that crops up in collections is P. sanguiniflora-violacea or violaciflora. This plant too is depicted in Kreuziner's "Revision" on page 24, top left (fig. 492). Fric notes here that they are plants with a large violet-purple flower; and adds that only a few plants with violet flowers were found, and that a sufficient number of their seedlings turned up with violet flowers too. Unfortunately the plants we have here are mostly selected from seedlings of P. rubriflora or sanguiniflora which happened to have a darker flower with a metallic sheen. There are few plants, either in our native collections or abroad, that have the typical "sanguiniflora" stem, spines brown rather than red, with bluish-violet flowers with a metallic sheen, with petals edged with lighter colour and a flower developing abruptly out of the tube. The ochre to brown stamens show through the tube, which appears yellow-orange on the outside. The anthers are longish, bright whitish yellow, the stigma thick and whitish; the wool is whitish to brownish. Here too the plant is certainly only a form of the two varieties above, which anyone can pick out of a bunch of seedlings. Nobody who puts their seeds on the market can guarantee that they won't come up as plain ordinary P.sanguiniflora. If they flower for me this year, we'll publish a few pictures in our journal, so that you can fill in for yourselves the details I couldn't give this time. More about the other red-flowered species, such as P. rubriflora Backbg., tafiensis Backbg. and sp.n. Catamarca next time.

BRAZILIAN CEPHALOIDS - By F. Ritter

Translated by R. Moreton from 'Kakteen u.a. Sukkulenten' for June 1968.
(Continued from Chileans No.11 pp 36-41)

5. The Generic Names of the Naked-Flowered Cephalium Bearers of South America.

These can be arranged in seven related groups, of which however two comprise only one species. Each of these groups I am presenting as a self sufficient genus, in total therefore seven. A closer analysis shows that all seven together with Pilosocereus and Cipocereus show a unique group of relationships and that they all have their origin in north-east Brazil, (probably in the states of Minas Gerais and Bahia). Six of these cephalium bearing genera have published names already, namely, Melocactus, Discocactus, Arrojadoa, Stephanocereus, Coleocephalocereus and Micranthocereus. The seventh genus comprises only the species dybowskii and I give it the name Gerocephalus.

As noted in Section 1, Backeberg included the species dybowskii in his genus Austrocephalocereus, for which he chose as type species Cephalocereus purpureus. The author Gurke had published another species under that name, different to that which Werdermann and, following him, Backeberg recognised. I sought out the true Cephalocereus purpureus myself and established that it belonged to the genus Micranthocereus set up by Backeberg. On the other hand, the false Cephalocereus purpureus of Werdermann and Backeberg belongs to the genus Coleocephalocereus, also set up by Backeberg. Therefore the name Austrocephalocereus must be dropped on technical grounds as well as due to Article 63 of the rules of nomenclature, since confusion exists about the type species of the genus. Backeberg had placed C. dybowskii in Austrocephalocereus. It has been shown however that the species is of different origin to Coleocephalocereus and Micranthocereus, so that a name of its own is required, as given above, Gerocephalus.

6. Comparison Table of Genera

To permit the better comparison of the nine genera of this related group I have given a review of the important characteristics of each genus in the table. (The first part of this table is included in this ussue - H.M.)

7. Coleocephalocereus, Melocactus and Discocactus.

The outstanding result of the comparison between the genera is the multiple correspondence between Melocactus and Coleocephalocereus which points to a very close relationship. The fundamental difference in the cephalia is just that those of Melocactus are terminal and those of Coleocephalocereus lateral. The snow-white, extremely fine covering of wool and bristles very similar. Coleocephalocereus is here, in principle, in agreement with Melocactus and Discocactus whilst differing from other cephalium bearers. The same goes for the ribs, which conform much more to Melocactus than the other genera. Likewise the spination is closer to Melocactus than the other genera. Claw-like spines, as found on a number of Melocactus species are, among the cerei of this group, to be found positively only on Coleocephalocereus. The flowers match the primitive flowers of Melocactus. The construction at the ovary end (not above it) Coleocephalocereus has in common only with Melocactus and Discocactus. It is lacking in all the other genera compared. The fruit appears like an enlarged Melocactus or Discocactus fruit, which is not the case in the other genera; the nature of the fruit flesh is likewise exactly the same. The seeds are more like Melocactus seeds than those of the other genera. To this is added the remarkable correspondence of the zonal arrangement of the flower which is absolutely the same in both genera, but is not approached by any other genus in this group. Specific observations reveal that the seedlings of Coleocephalocereus, contrary to all other cerei of this group, have a very stout style of growth. Thus C. pachystele begins as a seedling with a globular shape, then elongates while simultaneously growing wider. A plant 20 cm. high has already reached the diameter of a plant several metres high, while Pilosocereus pachycladus Ritt n.n. which grows just as large and thick has at 20 cm. reached only half its final width. Even more remarkable in this respect is Coleocephalocereus aureus, which I discovered. Young plants are really globular, my own specimens have already, at a height of 4 cm., a diameter of 5 cm. In growth, ribs and areoles it resembles to the point of confusion many Melocacti. The long bent spines are similar to many Melocacti. This species forms its cephalium when it reaches a height of 15-20 cm. and the plant generally only becomes 20-40 cm. high and 6-7 cm. thick. We must regard Coleocephalocereus as the primitive stage of development with Melocactus and Discocactus diverging. With the formation of a terminal cephalium at a young stage, in place of a lateral one, further growth upwards is prematurely prevented; therefore the two latter genera must remain in the globular state, whereas for Coleocephalocereus, as a result of developing a lateral cephalium the way to a cereoid growth remains open. For Melocactus and Discocactus no other link appears except to Coleocephalocereus. The latter however shows a link to the primitive genus Cipocereus. We can therefore reconstruct approximately the evolutionary stages :-

Leptocereae - Cipocereae - Coleocephalocereus < Melocactus / Discocactus

the last two near to each other.

Buxbaum has expressed the opinion "Discocactus is undoubtedly connected, as has been shown by exact investigations in recent years, to Weingartia. The connection from Melocactus is clarified by the position as a connecting link of Melocactus delessertianus,

BRAZILIAN CEPHALOIDS

Character	Discocactus	Melocactus	Coleocephalocereus
Form	Globular with terminal cephalium. Body grows further around the edge after the formation of the cephalium.	Globular or slightly elongated with terminal cephalium, hard fleshed. Body does not grow further after formation of cephalium.	Cerei with lateral cephalium, low growing and prostrate to erect and 6 m. high. Solitary or branching from the ground. Rather hard to soft fleshed. Seedlings with markedly stout growth.
Ribs	Rather numerous, rather narrow, crenate, somewhat sharp to rounded, sometimes almost broken into tubercles.	Rather numerous, higher, not or slightly crenate, triangular in cross section, corners more or less sharp.	Few to fairly numerous, low to fairly high, crenate to almost straight, triangular in cross section to more rounded. Corners sharp to blunt.
Cephalium	Terminal, fine, thick white wool and many long strong curved bristles. Is not grown through by new growth, grows out laterally.	Terminal, with fine thick wool and many long slightly curved bristles. Is not grown through by the new growth, grows further cylindrically upwards.	Lateral, with very fine, very dense white wool and many thin or thicker long bristles. Cephalium narrow to very wide, not sunken into the stem. Ribs of the cephalium much depressed and narrowed.
Areoles	Far apart	Far apart	Rather far apart.
Spines	Few, awl-like, stiff.	Not numerous, awl-like to thick needle like, straight to bent, the thinner ones flexible.	Not numerous, thick, needle like straight to curved, flexible. Seedlings without hooked spines.
Flowers	Nocturnal, large (D.hartmannii and placentiformis). D.alteolens differs greatly (Krainz 'Die Kakteen' CVId)	Open late afternoon, very small. They surround the cephalium and noticeably project. Ring-shaped zones of ripe fruit form, up to the buds in the centre.	Nocturnal, medium size. Arrangement of flower as in Melocactus.
Ovary	Longer than wide with constriction at the upper end, with few if any scales.	Longer than wide, with constriction above, scaleless.	Round, with constriction above with few or no scales.
Nectary	Long, with projection of wall above.	Long, without projection of wall above.	Long, with or without projection of wall above.
Tube	Circular from nectary upwards, about as long as the nectary.	Tubular, shorter than the nectary.	Tubular, longer than nectary, naked with a few small scales.
Stamens	Basal stamens in several rows, not thickened, leaning against the style. Above this a gap. Stamens of upper series hardly shorter than the lower or shortened until the anther is sitting on the wall.	Development from Stage 1: all stamens similar, with anthers near the wall to somewhat shorter above, without a gap, to Stage 2: lower stamens in one row, thickened forming an incomplete diaphragm, with or without a small gap above, the upper series of stamens so shortened as to be sitting on the wall.	Basal stamens thickened or not thickened, leaning against the style, ends upright or curved together. With or without a gap above, the upper series on the wall, with little or great shortening.
Petals	Long, expanded, not rotate, white: upper tube-scales petal-like.	Rather short, rotate, red.	Rather short, rotate, white with red or only the outer ones rotate, the inner ones upright with the ends bent outwards and greenish-yellow.
Fruit	Long, clavate to somewhat spindle shaped, white to red.	Long, clavate, red, naked; the surface with faded flower remains not sunken, small (relative to fatness); fruit not exploding, thin walled. Skin not refractive of light. Flesh juicy, white, insipid.	As in Melocactus; however, the area with the dried flower remains, somewhat larger.
Seeds	Matt, round, tubercled. Tubercles conical and extensive. Hilum roundish, not oblique.	Matt, smaller; tubercles finer and closer together. Hilum oval, not oblique.	Rather like those of Melocactus.
Distribution	Warm areas in Brazil, Paraguay and Bolivia, north of 25th parallel.	In the warmest areas between the 23rd North and South degrees of latitude.	The South of the states of Bahia, the East of Minas Gerais and along the coast from Rio de Janeiro State to Sao Paulo with at least six established species all isolated from one another. (Previously only two were known).

the flowers of which link the build of the typical Discocactus with those of the much reduced flowers of the other Melocactus species" (I.O.S.Bulletin Vol.2.P.56). It seems to me however that Weingartia, which geographically is far removed from the tropical genera Melocactus and Discocactus, coming from the temperate and cold areas, is vary far removed from these two cephalium bearing genera. In body shape, flower and fruit Weingartia is completely different.

COMMENTS FROM R. MORETON

"I can confirm what Ritter says about Coleocephalocereus being globular when young. My seedlings look nothing like Cerei, but could easily be mistaken for Melocacti. The Cipocereus minensis that I have is rather like a Cleistocactus, erect at present, but could become decumbent I should think".

COMMENTS FROM J.D. DONALD

"The complete article on 'Naked Flowered Cephalium Bearers of South America' by Ritter is important, particularly that part concerning the relationship between Coleocephalocereus, Melocactus and Discocactus which deserves to be more widely understood.

Buxbaum's notions of a relationship between Discocactus and Weingartia do not bear examination. The two genera only show a superficial relationship in body morphology and then only with the immature Discocactus without cephalium. The whole structure of the flower, fruit, and seeds are widely separate and show no clear relationship. Weingartia shows no sign at all of any cephalium - it flowers normally from mature areoles. Its only peculiarity is that some species produce more than one flower per areole in succession - rarely simultaneously."

COMMENTS FROM K.V. MORTIMER

In general I agree with all Ritter has written; the differences between Coleocephalocereus and Melocactus flowers is minimal - the only obvious difference to the non-botanist is colour. The only other difference that I have noted is the lack of seed pods on Coleocephalocereus compared with the large numbers occurring on the Melocacti.

The species which I am growing have thrived for two years under a minimum winter temperature of 50°F. They have cephaliums and rooted quite easily as do most Melocactus. They like a little moisture in the winter and a bright position. Given these requirements they have flowered freely.

Coleocephalocereus aureus seems the most difficult of the species I have in cultivation. The West Indian Melocacti do not thrive in these conditions - they require higher temperatures, 60°F and regular watering. In habitat they never rest completely. If they are kept at lower temperatures they develop brown spots on the ribs and will eventually die.

All these plants do best in a rich open compost and if you have the right temperature they are not difficult.

SOME MORE THOUGHTS ON GRAFTING

By A.W. Craig

During the past year I have tried grafting several species, each on to more than one type of stock. All these grafted plants have been potted up in the same soil mix, in many cases in the same pan, and also watered similarly. It has now been possible to observe the differences in the growth of a species on different stocks.

One plant of Neochilenia malleolata, the very woolly form grown from the seed offered a couple of years ago by H.E. Born, is grafted on a stock which is probably Trichocereus pachanoi. The areoles on this scion are very closely spaced, with much upstanding white wool and very little sign of any spines. One can distinguish immediately below the areole a rose coloured protuberance of some 2 mm or so in height, with a remarkable horn-like form. This plant offsets freely and three pups have been grafted on to Trichocereus bridgesii. These are growing with a slightly wider areole spacing and are thus of a more open appearance. The individual areoles are equally woolly but in addition one can see 6 to 8 spines per areole, light brown in colour and up to 3 mm. long. The protuberances are still being formed below each areole but are not quite so distinctive.

Also on two different stocks are plants of Neochilenia (Chileorebutia) krausii, one on Harrisia (Eriocereus) stock where the areoles are about 4 mm apart on the body of the scion and in the crown they are of course much closer; here they are so woolly that they obscure the body for about $\frac{1}{2}$" across the crown. On Trichocereus bridgesii the growth is more open - the areoles being about 6 mm apart. As there is a gap between the areoles almost up to the growing point the crown appears to be very much less woolly although there is probably just as much wool on each areole on plants on both stocks.

In one half pot I have three grafted plants of Pediocactus knowltonii - two on T. bridgesii and the other on T. spachianus. On T. bridgesii the scion has very little areole wool and a much more open growth with extremely poor spines, whereas on T. spachianus the areoles are much more closely spaced and the spines much stronger - in fact very little different from my small imported plant on its own roots. I have plants of Epithelantha micromeris v. greggii and its cristate form on both T. bridgesii and Myrtillocereus geometrizans. Both scions exhibit close areole spacing, although not quite as close as plants on their own roots, but the scions on T. bridgesii increase in size at about four times the rate of those on M. geometrizans.

One question often posed is "What is a compatible stock for a given species?" I have two plants of Blossfeldia lilliputana, one being a plant from Japan under the name of 'lilliputana monstrose'. This latter I have great difficulty in grafting on T. bridgesii while with the normal plant I think every one has taken. Similarly, I find Epithelantha micromeris v. greggii is extremely easy to graft on to a stock, six out of six taking, whereas with the normal E. micromeris possibly only 25% take when grafted.

It is very difficult to come to any hard and fast conclusion as to which is the best stock to use as this seems to vary considerably even with closely related scions, but I favour a stock that will "blow up" a plant irrespective of spination, then to degraft it and root down. Within a very short space of time it will take on its normal appearance, as for example have two Solisia pectinata which within a year of degrafting are indistinguishable from my imported specimen.

NEOPORTERIANAE - EXTRACTS FROM THE GERMAN ROUND ROBIN

.... from Herr Fethke

Firstly, for our mutual understanding we must agree on a terminology that is simple and workable for everybody, even if we are not familiar with botany. I propose, on purely practical grounds, to follow Backeberg.

We should give the name Neoporteria only to those plants with flowers with recurved inner petals. Neochilenia always have expanded petals; certainly some flowers are very hairy. It is difficult to make a separation of Horridocactus - perhaps it is possible from the spination of the large species in habitat. It becomes even more difficult when we deal with Pyrrhocactus, for even after a study of plants growing in Chile we can separate cultivated plants only with difficulty.

I can see it is possible that if someone talks about Neochilenia that he has in mind a species similar to a type which is at least well illustrated in literature and which is typical of a smaller group. For example, the group designation 'Chileorebutia' is meaningful if one refers to earth cacti (in habitat mostly with tap roots, more of the body below ground than above) and then subdivides into one group those species similar to the napina type, into a further group those species like aerocarpa-krausii-malleolata; then there remain only a few cases such as FR 204 recondita, etc.

We should attempt such grouping of species with exterior similarities for the whole of the Neoporteria/Horridocactus/Pyrrhocactus/Neochilenia complex. Thus everyone knows N. paucicostata which has many similar 'relations'. If we can agree over these little groups then the names of our plants will be meaningful.

I keep all my plants very warm in winter, never under 10°C. and completely dry. I only keep plants on their own roots and these don't grow in winter. In summer and autumn I give long, dry periods. Therefore the plants are so hardy that in winter there is very little shrinkage.

... from Herr Liesel, Czechoslovakia.

I have mentioned previously that Chileans grow rather elongated if grafted on to E. jusbertii. For that reason I have grafted now on to a strongly spined Trichocereus species. The height of the graft this time was only 3 cm. with the stock 4 cm. diameter. The plants now seem much better and - most important - also more natural. The spination in particular has much improved. The plant was 4-6 cm. dia. at the time of grafting.

I have a question for everybody; why are Neochilenias/Chileorebutias difficult to pollinate; or put in another way, why is it difficult to get these plants to set seed when pollinated?

... from Herr Stenzel

My N. gerocephala blooms with me in May - it is one of the few summer flowering species. An import of N. nigrihorrida has bloomed in June for five years running.

In response to Herr Liesel's query, I have established that the pollen is dry when the bloom opens. I believe, therefore, that buds ready to open must await several days of sun.

... from Herr Tauber, East Germany.

I cannot comment on how suitable E. jusbertii is for grafting Chileans, for I have no jusbertii for a similar experiment at my disposal. I use only Echinopsis, T. spachianus and macrogonus.

I do the exact opposite of Herr Fethke in winter - I keep my plants very cold and discontinue watering often at the beginning of September. I cannot complain about lack of flowers. But perhaps it is not important in our latitudes whether one overwinters them cold or warm: the main thing must be the light which they need copiously in accordance with their natural conditions.

I find Neochilenia and Chileorebutia are not difficult to pollinate. Have you perhaps two plants of one clone? It is not so easy on the first day of flowering, best on the third day for then the pistil opens somewhat. For the first two days it remains closed and cannot take up the foreign pollen. One can open the stigma artificially and then pollination can be achieved on the first day of flowering.

This year, as every year, I have had an abundance of flowers on my Chileans. In December and February these flowered: Neoporteria rapifera, microsperma, gerocephala and villosa.

I have also flowered Reicheocactus pseudoreicheanus and the FR Lobivia famatimensis - the alleged rediscovered Lobivia famatimensis which, according to Buining, could be identical with pseudoreicheanus, but which from my observations has completely different buds and flower structure but which can be pollinated with pseudoreicheanus and vice versa.

I keep the greater part of my plants on their own roots, but in very small pots and seldom repot. The Neochilenia reichei were 30 cm. long and never flowered. I then cut them up into several pieces and at last this year I have flowers on all.

... from Herr Kinzel

I believe E. jusbertii is a very unsuitable stock for Chileans except for seedlings, on the following grounds. Whosoever has a large collection of Chileans (or, like me, Islaya) of which the majority are on their own roots would do well in winter to maintain a fairly prolonged dry resting period - and E. jusbertii as grafting stock does not stand up to this. I have often observed that a jusbertii stock during the winter rest just becomes exhausted and dried up and then I always have trouble in newly rooting the cut-off scion, whose lower part in the course of time has grown round the thin stock - unless I am prepared to cut it off half way up.

I believe that the best stock for Chileans is perhaps T. pachanoi, which is robust enough to withstand a longer dry period. If, on the other hand, one overwinters plants grafted on jusbertii warmer and somewhat damp, then the stock certainly lasts out. But then I fear that the scion steadily becomes elongated and shy to flower.

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THOUGHTS ON THE GROUPING OF THE SPECIES OF THE GENUS GYMNOCALYCIUM FROM THE FORM OF THE SEED BY HERR TILL AND HERR BAYR

Translated by E.W.Bentley from the June 1965 issue of the Austrian Cactus Society newsletter.

In 1962 Dr. Bohumil Schutz published in the Czechoslovak Cactus Journal 'Friciana' an article 'On the Systematics of the genus Gymnocalycium' based on the works of the Czech

collector Fric. Schutz again used Fric's ames - already known and familiar - for the various seed groups, viz:- Macrosemineae, Ovatisemineae, Microsemineae, Trichomosemineae. He went further, however, in that he divided Fric's groups into sections. His paper shows that publication was preceded by a thorough study of the material.

If one remembers that Schutz was very isolated and was mainly dependent on the small amount of imported material brought in by Fric, one must admit that he had produced a thoroughly good work. The abundant importations since 1961 have indeed cleared up a few obscurities and shown that a few small re-arrangements must be made, but it will hardly be necessary to alter significantly the funamentals of his system from the point of view of relationships. It is true that a few plants are now given names of species rank which have proved to be variations or even forms. However, all plants named below are, with few exceptions, classified where in all probability they belong.

The group Macrosemineae is divided into the sub-groups or sections:

a) Denudata, with the species: denudatum, fleischerianum and megalothelum.

b) Uruguayensis, with uruguayense, artigas, netrelianum, leeanum, hyptiacanthum, melanocarpum.

The position of guerkeanum is not clear. According to my investigations, guerkeanum belongs to the section Uruguayensis (see Chileans No.7 pp. 6-7 - H.M.). G.hyptiacanthum could be the connecting link with the seed group Ovatisemieae, for its habit resembles that of G. hyptiacanthum citriflorum yet its seed belongs rather to the Ovatisemineae.

The group Ovatisemineae is divided into the two sections:

a) gibbosa, with species gibbosum, chubutense, brachypetalum and baldianum.

b) lafaldensia, with bruchii, lafaldense and albispinum.

In my view and also that of Bozsing, the section calochlora which Schutz placed in the Microsemineae group belongs here. According to Schutz the section calochlora contains the following species:- calochlorum, proliferum, sigelianum, sutterianum, capillaense, deeszianum, leptanthum(?) and andreae(?). The last two species were accompanied by a query and probably rightly so, for they belong from their habit, flower structure and seeds elsewhere. Whilst I am not quite sure about G. andreae, I am certain that G.leptanthum should be put with G.baldianum. Indeed, it is highly probable that it is only a long-flowered form of G.platense.

The seed group Ovatisemineae is the one with the widest distribution range and indeed stretches from Southern Argentina from whence from our present knowledge only plants of this seed group occur, to the north of this country. At Tafi, in the province of Tucuman, a form of G.baldianum was formerly the most northerly example of this seed-group. The imports of the last four years, however, have shown that there are so many smooth transitions between the species in the section calochlora that it is scarcely possible any more from studying a large collection of imported plants to draw a line between individual species. Such transitions are not only to be found within the seed-group. In one of the last imports of 1964 were found plants of G.sutterianum which, without flowers, would have been put straight into G.multiflorum.

The third seed group of Schutz's , the Microsemineae, is richest in species of those in his system and comprises the sections:-

a) Hybopleura
b) Calochlora
c) Multiflora
d) Loricata
e) Mazanensia
f) Saglionia

The seed group microsemineae provides perhaps the hottest problems of what is already the hot problem Gymnocalyciums. The section calochlora does not belong to this seed group - as already observed. It is here that Schutz has made his one big mistake.

As the first section of the seed group microsemineae Schutz put the class hybop leura with the species:- hybopleurum, kurtzianum, mostii, grandiflorum, valnicekianum, oenanthemum, rubriflorum, bicolor, and nigriareolatum.

The extensive imported material that I have been able to study in recent years has shown that G. hybopleurum is an extraordinarily variable species and it is not therefore surprising that formerly, as a result of ignorance of the extent of variation, forms were described as species. It happens often enough today that one believes one has something quite new among imports from a new locality. Usually after long observation it sooner or later happens that one has only a form of a long recognised species. On the strength of my observations, Schutz's section hybopleura comprises two well-recognisable and separable sections. These are 1) the section around hybopleurum, with oenanthemum, bicolor, and the newly established pugionacanthum, and 2) the section around mostii, with kurtzianum, grandiflorum, valnicekianum, nigriareolatum and curvispinum, as well as horridispinum, recently described by Ing. Frank.

Passing over now the section calochlora which does not belong here, we come to the section multiflora with the species multiflorum, monvillei, and brachyanthum (the latter with the body of G.multiflorum and the flower of G.mostii). Whether it is a case of three names when in reality there are three, two, or even only one species, has not yet been satisfactorily clarified. I am busy at the moment, in collaboration with my friends, in clearing up this problem.

Loricata is the next section in Schutz's division. Included in it are the species spegazzinii, horizonthalonium, and cardenasianum. G.spegazzinii has been imported in great quantities in recent years, and in many forms. The view of Herr Frank that the species characteristics of G.spegazzinii should be widened to embrace all these forms is not to be ruled out. Hereunder, according to Backeberg, must fall G.horizonthalonium. G.cardenasianum is a fierce-spined, fine species with a short bell-like salmon-pink flower.

Schutz called the next section mazanensia with the species:- mazanense, weissianum, guanchinense, castellanosii and nidulans. Certainly extensive research is needed to be able to say anything really concrete about this class. Extensive imported material has shown that it is scarcely possible yet to draw a dividing line between the various species. At any rate, one can see best from this section where one can be led by hasty publication based on plants about which one knows no more than that they differ somewhat from each other.

Saglionia, the last section of this seed group, has the smallest seeds of the genus Gymnocalycium. The arrangement within this section is surely a matter of guesswork for, apart from saglione, pflanzii and zegarrae, we recognise (in Europe at least) no further species with 100% certainty. G.tilcarense is perhaps only a form of saglione. G.lagunillasense has the biggest prospect of acquiring specific rank. G.marquezii is perhaps only a small form of

G.pflanzii, especially as Prof. Cardenas wrote that the plants from all the present collecting localities for G.pflanzii differ from each other.

A peculiarity of note in this section is that when the fruit ripens it splits circumferentially and not down the side as in the other species of this genus. Both the remaining species probably belong elsewhere. The published translation from the Spanish of the description of G.eytianum Card., with two pictures, in K.u.a.S. 1958:2:p.25 (although at that time no description of the seed was available) threw doubt upon the affiliation of G.eytianum to G.pflanzii. A sequel in the same Journal (1960 No.3) with the description of the fruit and seeds of G.eytianum brought certainty that this species does not belong here. The flower with its unusually long ovary differs markedly in form and colour from the other species of this section; nor does the spindle shaped dark green fruit tally with the distinctively more spherical, mostly grey to blue-green, transverse-splitting fruit of this section. The seed is brown, pitted, and dull and has only the brown colour in common with the longish, smooth, and glossy, seeds of G.pflanzii.

Whether G.riograndense actually is a Gymnocalycium has yet to be clarified. Perhaps here we have a Weingartia. My information is that at the time of writing there can be no plants of G.riograndense in Europe. According to reports, Cardenas must have found only one specimen of this species - which is all the more credible because Prof. Cardenas has not yet produced a description of the fruit and seeds (at least not to my knowledge at present). Since the discovery of the species in 1955 it must have flowered repeatedly so that the description of the fruit and seeds should have been able to be produced afterwards - as was the case with G.eytianum.

The fourth seed group Muscosemineae of Fric was divided by Schutz into four sections as follows:-

a) Terminalia
b) Periferalia
c) Nigroantheralia
d) Chacensia.

Terminalia has the species: schickendantzii, michoga, pungens sp.n. (stuckertii sensu Fric).

Periferalia has species delaetii, tortuga, marsonerii, knebelii, tudae, onychacanthum.

Nigroantheralia with anisitsii, damsii, and joosensianum. Chacensia with mihanovichii. This seed group is clearly an isolated one and the seeds are obviously not to be confused with those of any other group. As for the species, great caution is advised. Many of the species have been and will be described by Czech authors from seedlings derived from imported seed. These descriptions of variants as varieties or even as species arouse no interest among so-called professional botanists. Here also much critical research remains to be done.

The fifth and last seed group Trichomosemineae is divided into two sections:-

a) Stellata, with the species platense (?), quehlianum, parvulum, asterium, ochoterenai, occultum, triacanthum, vatteri, ragonesii.

b) Riojensia, with the species bodenbenderianum, riojense, and nidulans (sensu Fric non Backeberg).

This seed group, too, is well self-contained, although in my view there are enough transitions to it. Here also the seeds are light and easily recognisable with the naked eye as belonging to this seed group. The arrangement of the species is, to be sure, a matter of opinion.

Plants belonging to this seed group have been plentifully collected and imported. The voluminous imported material has made possible a good look at this interesting seed group. How clearly - even whether - the individual species can be separated, or whether one can only talk of form-groups will involve much more head scratching. The unbelievably great wealth of flowers in this seed group, with its smooth transitions from almost every species to the next, makes any attempt to define clearly the boundaries of a single species impossible.

The division of the genus Gymnocalycium on the seed characters alone will by no means solve all the questions in this large and interesting genus. Similarly, a system based on habitat or flower characters will not give satisfaction. Only the combination of all characteristics such as habitat, flower, fruit, seeds, and - in the last analysis - incidence, as well as an accurate and conscientious observation of the first generation descendants of imports, can succeed in this task.

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COMMENTS ON ARTICLE BY HANS TILL AND DR. BAYR

Large genera are always examined closely by systematists with the object of finding sub-generic relationships among the species. Many criteria have been used among the Cactaceae, such as types of spine, types of sap, forms of flowers and forms of seeds. The eighty-odd species of Gymnocalycium currently recognised were divided by Backeberg into groups based mainly upon the flower shape, though he also noted other features, including seeds. The Czech botanists Fric and Kreuzinger attempted to classify Gymnocalyciums on the basis of seed-form prior to the Second World War. This work has been continued, revised and extended by present-day Czech workers, especially Bohumil Schutz. Critics of Schutz's work have pointed out that considerable variation of seed-form occurs between species of Cactaceae known to be closely related to each other. On the other hand, cases are known where seed differences do appear to correspond to real taxonomic sub-divisions. Thus the distinction between the Toumeyas and the Turbinicarpi is clearly reflected in the seeds.

Dr. Bayr and Hans Till make a sound point in their final paragraph when they say that the only truly satisfactory sub-generic classification of Gymnocalycium will be one which takes into account all the features of the plants. In the interval while we wait for such a system, Schutz's seed classification is of great interest and can be regarded as an interim step in the progress towards a fully acceptable scheme.

E.W. Putnam

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THE CLASSIFICATION OF THE GENUS GYMNOCALYCIUM - 2

By G.J. Swales

In concluding my article in the last issue of the Chileans, I referred to the subdivision of the five main seed types. This was carried out by Dr. B. Schutz in 1962 and was based on considerations of flower form and colour, body characteristics, and distribution. This article was published in Friciana that year, without an English summary, so that the original work is at present denied us. However, the article by Till and Bayr (above) makes direct reference to the earlier Schutz article.

From my recent studies of the seed at my disposal, I am as yet unable to make valid comment on the reference to G. hyptiacanthum, but can support whole-heartedly the transfer of the

calochlora group from the MICRO - to the OVATISEMINEAE. Having looked at seed of all these species, it seems quite obvious that they had previously been misplaced.

The seed specimens which I possess of both G.andreae and G.leptanthum look typically OVATISEMINEAE, but what really does worry me is the statement that G.leptanthum is highly probably only a form of G.platense (which is a member of the TRICHOMOSEMINEAE). I cannot envisage a form involving membership of a completely different seed group.

There is a later reference to the problem of identification of sutterianum/multiflorum; here, examination of the seed (if available) would give an answer immediately.

The problem of the subdivision of the Multiflora group could also possibly be assisted by seed study - indeed the authors of the article may have done this by now. But three seed specimens each of G.monvillei and of G.multiflorum, in my material, show a reasonably obvious difference in appearance, although undoubtedly both are members of the MICROSEMINEAE. Unfortunately I have not yet obtained seed of G.brachyanthum to cross check with the other two.

Some of the other problems mentioned might also be helped by reference to seeds but the tendency seems to be away from seeds once the main division into five groups has been made; greater importance would then seem to be attached to the characteristics of the plant body and the flower.

The reference to the saglione fruits and their way of splitting circumferentially reminds me that now the flowering season is with us again, I shall always be pleased to receive whole fruits or a minimum of five seeds from a ripe fruit (together with any notes on size, shape, etc. of the developing fruit if available) from fellow subscribers. First hand information of this kind is very useful, even though one must always bear in mind the chance of wrongly named or hybrid material.

Any comments or observations on flowers or fruit on Gymnocalycium will always be welcome, especially if you find differences between plants in the main sections or the groups listed in the article by Till and Bayr. - H.M.

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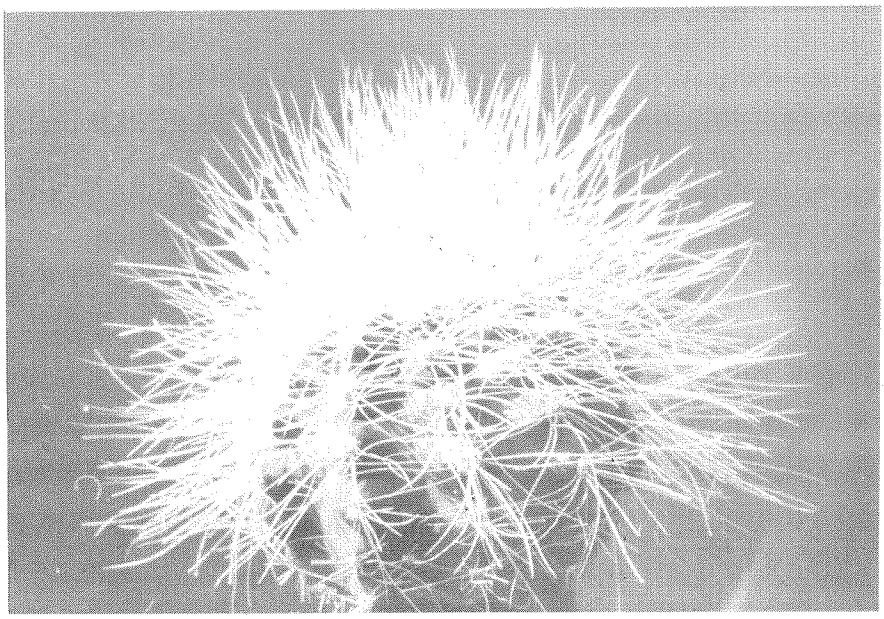
COPIAPOA KRAINZIANA Ritter

By R. Ginns

Copiapoa krainziana is stated by Backeberg to be the most beautiful of the Copiapoas. This is a matter of opinion as, whilst there are many white-spined cacti, other species of Copiapoa with matt-grey bodies and long, jet-black spines are really attractive and unique, at least when young. Actually I find most of the Copiapoas more beautiful when young than when mature.

The plants in the photos are somewhat lush and show far more of the dark, olive-green epidermis than is shown in Backeberg's Fig.1842 (Die Cactaceae Vol.III) or, indeed, in my own two plants where the hair-like spines almost hide the body. Neither of my plants has flowered and Backeberg states that the flower is unknown. This may no longer be the case, however.

The plant named by Ritter as C.krainziana has soft, curly, hair-like spines. His F.R.209 which differs in having stiffer, straighter spines he named C.scopulina. Backeberg considers this to be merely a variety or a form of C.krainziana. Whilst I like different plants to have



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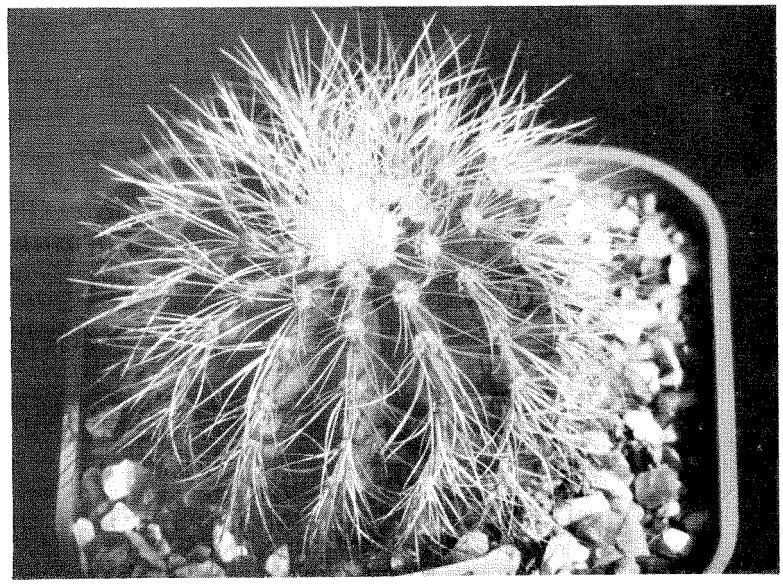
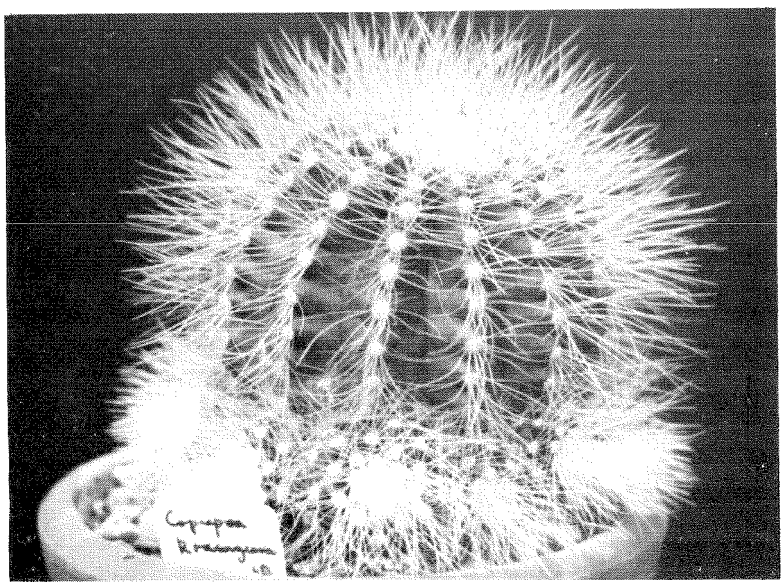
&
Photograph
A. W. CRAIG

Collection
A. HENSON
Photograph
D. J. LEWIS





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D. J. LEWIS

COPIAPOA KRAINZIANA

different names, in this case I am going even further than Backeberg and consider them both to belong to the same variable species. My reason for this is that from a packet of Ritter's collected seeds I obtained both forms and also intermediates. To warrant a distinct name, apart from cultivars, I consider that they should come true from seed, unless hybridised.

Just one further point of interest, I have read that one of the reasons for hair on a plant is to protect the body from too much sun. In 30 years experience of cactus growing I have only had three chases of sunburn - Euphorbia obesa, Haworthia bolusii and Copiapoa krainziana. In the latter case the hair certainly did not protect it but may have caused the trouble by enmeshing drops of water that acted as burning glasses.

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SOME COMMENTS ON COPIAPOA KRAINZIANA

... from H. Middleditch.

It is of considerable importance to note that in his notes above, Ron Ginns refers to "Ritter's collected seeds". We seem to have no record of this species having flowered in cultivation, so that we have a situation (unfortunately all too rare with South American echinocactanae) where collectors can apparently rely on plants being true to type. This would mean, logically, that any variation of habit apparent in cultivation is a reflection of what can be found in habitat, rather than being due to the usual cause of inadvertent cross-pollination in cultivation.

There are ample traps for the unwary when it comes to identifying these plants. In Vol.VI of Backeberg's Die Cactaceae we may find an illustration of a Copiapoa krainziana, described as 'One of the normally spined strikingly variable seedling forms', with straight spines between light brown and black in colour. Adjacent is a plant somewhat thinly covered with white spines, described as 'Copiapoa scopulina'. In Backeberg's later publication, his Kakteen-Lexicon, C.krainziana is described as having white to grey spines and scopulina as having brown or black spines; the authority for this description is inferred to be Ritter in Taxon XII:1,30.1963.

The conclusion I feel obliged to reach is that Ron Ginn's outlook is probably right - this is indeed a very variable species and it might well be advisable to discontinue the use of the name scopulina. I have a plant in my own collection which was acquired as C. krainziana v. bruinispina; whilst the purists may object that this is only a horticultural description and not a valid name, it has at least the outstanding merit that it did know when I sent for it that I was going to get a brown-spined plant - and it was!

Ron Ginns mentions elsewhere that his seedling krainzianas are still solitary; one of his seedlings which is now in the collection of T. Lavender has produced a ring of pups from the base, It would seem that most plants of this species do offset when the plant has reached a certain size - say about $3\frac{1}{2}$ inches in diameter - rather than a certain age.

The body colour of the smaller of my two krainziana is grey-green, while the larger is a slightly greeny-red. In Vol.VI of Die Cactaceae Backeberg says krainziana generally has a grey-greenish body, more greenish in the shade and more grey coloured in the sun with sometimes a faint red tint whereas C.scopulina Ritter has a grey-olive green body.

Whilst this Copiapoa would seem by repute to be exceedingly difficult to flower, I have just heard from New Zealand that it has been known to bloom there. Any further information would be most welcome.

THE CHILEAN "EARTH-CACTI" (Continued from Chileans No.12. p.92-94)

by Paul Weisser

Translated by E.W.Bentley from the G.O.K. Newsletter for April 1968

'.....Our lecture is concerned with only a small section of Chile, the area along the coast between Antofagasta and Coquimbo, which has the combination of a desert climate with oceanic overtones and high skycover. Here, in the region of the coastal mist, on the outskirts of the Atacama Desert is the main area of the Chilean earth-cacti. The climate picture at the representatively sited Caldera Station gives us further information. According to this Caldera has 12 dry months. The average temperature over the whole year lies over 10°C. The precipitation is low: 26.9 mm. as a yearly average. Rainfall chiefly in the winter months, May, June, July and August. Frost occurs at no time of the year. Summer temperatures - as a result of the influence of the cold Humboldt Stream - are lower than would be expected from the latitude of the region. Further there were only 44 cloud-free days against 101 overcast days - much mist also; the sun first breaks through the mist cover mostly around midday. After sundown the land cools quicker than the sea, the humidity condenses and brings life-giving water to the plants existing under these extreme environmental conditions.

Eulychnia for example spreads out an enormous network of roots just under the soil surface and with it can take up quite small amounts of precipitation; Neoporteria cephalophora shows marked root succulence and brings to mind thereby the earth-cacti. The first contact with "true earth-cacti" cost Herr Weisser a crate of beer. Friend Lembcke said to him, "I'll take you to within 2 m. of the plants and I bet you won't see anything! ". Herr Weisser lost his bet. This is not surprising for in form and colour these small plants quite resemble the surroundings, in dry periods they shrink deeply in and the desert wind blows sand over. The quartz sand to a certain extent lets through the necessary light for photosynthesis. Lembcke designated as earth-cacti "all species in which the succulent below ground part of the plant is bigger than the above ground part". According to this the expression "Earth-cacti" has a physiognomical-ecological, but not a systematic meaning - though there certainly exists a relationship between the majority of Chilean earth-cacti.

From the paper in the Deutschen Botanischen Gesellschaft (1967, No.6) "On the earth-cacti of Chile" by Paul Weisser, I quote the chapter headed "Systematik" :-

"Philippi during his journey in the Atacama Desert (1853-4) discovered the first Chilean earth-cacti, which he described in his work "Florula atacamensis" (1860) under the names Echinocactus humilis Phil. (Copiapoa humilis (Phil.) Hutch) and Echinocactus occultus Phil. (Neochilenia occulta (Phil.) Backbg.) Later he published two further species:- Echinocactus napinus Phil. (Neochilenia napina (Phil.) Backbg.). Unfortunately these descriptions are incomplete, as are the data about location. Backeberg (1966) named in addition the following dwarf cacti for Chile: Copiapoa hypogeae Ritt., C.mollicula Ritt., C.tenuissima Ritt., Neochilenia aerocarpa (Ritt.) Backbg., N.chorosensis (Ritt.) Backbg., N.imitans Backbg., N.krausii (Ritt) Backbg., N. lembckei Backbg., N.malleolata var. solitaria Ritt., N.mebbesii (Hildm.) Backbg., N.mebbesii var. centrispina Backbg., N.monte amargensis Backbg., N.odieri (Lem.) Backbg., N. pseudoreichei Lembcke et Backeberg, N.pygmaea (Ritt.) Backbg., N.recondita (Ritt.) Backbg., N. residua (Ritt.) Backbg., Reicheocactus floribundus Backbg., R.neoreichei (Backbg.) and R.pseudoreicheanus Backbg.

Backeberg places the Chilean earth-cacti in the genus Neochilenia, while Ritter uses the genus name Chileorebutia for the earth succulent Neochilenia species. The identity of the species is by no means clear and this enumeration cannot be regarded as complete.

A revision of the group is imperative. How far all these species can be considered as earth-cacti in Lembcke's sense is undecided for many of the details on natural growth form and root structure are lacking.

The earth-cacti occur often in areas where the scanty rainfall can collect: they grow for example on terraces on the steep slopes of the coastal cordilleras, sometimes also in crevices. They have, for their small mostly flattened bodies, enormous tap-roots (storage organ for water and foodstuffs). The extent of the sinking of the shoot part into the ground, the volume and the form of the tap-root, as also the form of the root-neck can vary between individuals of one and the same species. Irrespective of the latter there are also marked interspecific differences. Thus N.reichei possesses a comparatively long and very thin root-neck, N.napina a thinner one still, N.imitans and N.pseudoreichei, no proper one. At about 2-3 cm. deep runs an extensive root network, the tips of which can die in prolonged dry periods, but after rain are regenerated. One Neoch. napina of 3 cm. diameter spreads its roots over a circle of 30 cm. radius.

A microscopic section of a tubercle of Neoch. napina shows us how well the earth-cacti are organised for maximum light utilisation and minimal water-loss. I quote again from Paul Weisser: "The mechanisms of transpiration protection are of great significance for the earth-cacti. In N.napina the papillose epidermis is covered with a cuticle of about 8 to 10 microns thick. The stomata are about 18 by 35 microns in area. They are set deeply and are only visible after careful paring down of the epidermis. Below a usually two-layered hypodermis composed of rectangular cells with strongly thickened walls begins the chlorophyllous assimilation parenchyma which gradually passes into storage parenchyma. The light factor seems to exert an important effect on the morphological structure of the earth-cacti. In conditions of insufficient light cultivated specimens grow tall and scarcely change to their characteristic colour. For its reddish brown N.napina has to thank the beta-cyanidine, located predominately in the hypodermis, that partly obscures the green of the underlying assimilation tissue. Its presence and quantity is proportional to the illumination intensity. Noteworthy is the tubercular form of the exposed surface of the earth-cacti, whereby the assimilatory surface is increased and the total radiation falling on each unit of surface is decreased. These tubercle-like elevations also make possible additional water storage, but increase the evaporation surface.

The papillose structure of the epidermis of N.napina can be connected with the light factor. Stahl (in Haberlandt, 1914) believed the epidermal papillae to have a light gathering function, since the light reflected in this part is lower than from level surfaces. This could be important given the mammillose surface of N.napina and the frequent misty days with diffuse light, so that the several-layered assimilation tissue has available a greater amount of light."

Of the plants that form the 'escort-flora' of the earth-cacti, Herr Weisser showed us various Eulychnias and Neoporteria cephalophora: the flowers of Copiapoa haseltoniana, in spite of their stiff spines are grazed by goats; Copiapoa carrizalensis grows in association with Oxalis gigantea, a yellow-flowering, woody shrub which does not in the least suggest a relationship to our four-leaved clover. Euphorbia lactiflua (milk-tree) loses its small leaves in the dry season. From the succulent stem - as in our species of spurge-emerges a milk sap on injury. It was hoped to utilize this plant for rubber production. However it is quite difficult to cultivate and is not sufficiently abundant in nature. Evil tongues hazard that the native collector had diluted the collected material with goat's milk, so that the rubber produced was naturally not very wholesome. So nothing came of a fine project.

Near Antofagasta and northwards from there also earth-cacti should occur, but Herr Weisser could not find any. According to Herr Frank from this region Ritter described (among other species) Pyrrhocactus aricensis, P.iquiquensis, P.residuus and P.reconditus and suggested that these species, on account of the 'life hostile' climate, were in course of becoming extinct.

In our collections however they may continue to thrive, because they grow freely and can easily be propagated. Ritter takes the view that this species group forms a transitional stage to Islaya. He puts them under Pyrrhocactus, Backeberg placed them in Neochilenia.

Eastwards from Antofagasta, the principal harbour of North Chile (transit place for copper and saltpetre), between the coast and the high cordilleras stretches the Atacama Desert, the dryest desert in the world. Yearly rainfall 'about nil'. For this reason the region is rich in mineral resources. The largest copper mine in the world, Chuquicamata, over 3 km. long and and 350 m. deep lies here in 'Great North Chile'. The ore is obtained from open-cast working and is partly smelted locally. Huge saltpetre deposits were formerly worked in about 300 industrial sites ("oficinas") that today stand as abandoned ghost-towns. Since the artificial production of saltpetre (in World War I) mining is no longer profitable .....

In the Travesia on the southern fringe of the Atacama it may rain once every 7 to 10 years. Within a short time the normally year-long vegetationless surface changes into a sea of flowers. Smithusen describes this phenomenon the "blooming desert" quite vividly (Die raumliche Ordnung der chilenischen Vegetation, Bonner geographische Abhandlungen, Heft 17): 'The sand flats in the Travesia and the coastal range near Totoral, according to the local inhabitants, have had no rain in the last 10 years. Twice in July 1952 and then once more on 1st August rain fell to a total depth of up to 30 mm. After this the formerly vegetationless area suddenly became green. A colourful flower layer spread itself within a few days over the whole surface of the Travesia. Close on 100 plant species were involved. A single one of these often determined the colour shade over a kilometer's width. Purple-red gleaming areas alternated with sky-blue, lilac, blueish white or light yellow. Yet one would never have envisaged the growth of this formation. The individual plants often stand densely near each other, however mostly so that they are not quite touching laterally. Almost always there remains visible much bare soil between them, especially since the coverage of single plants owing to the extremely economical development of the vegetative shoots is low. The height of the plants varies between only a few centimetres up to some 30 cm., exceptionally even 40 cm. Their flowers on the other hand are some of them strikingly large, and it is these flowers above all that when one glances over the wide area calls to mind the impression of a uniform plant carpet. The number of individual plants over the area is extraordinarily high. The picture of the ephemeral herb flora stands thus in marked contrast to the distribution of the perennial desert plants in the dwarf shrub formation, where the individual plants often stand at intervals of tens of metres and the surface therefore seems at first glance to be vegetationless'.

Herr Weisser remarks at the end that much of the lack of success in growing 'Chileans' arises from a lack of knowledge of the factors in their environment - a lack that his talk was designed to obviate.

* *

NEW FRAILEAS

By Klaus Wagner. "Kakteen/Sukkulenten" 1968. (E. Germany)

Translated by K.Wahle.

In the last few years, many new plants have been found in this genus. I saw, during my last visit to Herrn Horyna at Liberec, Czechoslovakia, again and without doubt many new forms or species. All the species have been found by the cactus collector Herrn Fritz Ritter, Olmue, Chile. I have been informed that Herr Ritter will describe and publish these plants in his book, on which he is now engaged. Therefore I cannot yet give any exact botanical names, and I must limit myself to the collectors numbers with the provisional names.

With the portrayed Fraileas FR 1369 pygmaea longispina sp.n., FR 1370a pygmaea altigibbera sp.n., FR 1385b pygmaea lilalunula sp.n. and Frailea FR 1366 pygmaea paucicostata sp.n. the forms of this species have been vastly increased.

A further very nice species is the already known Frailea horstii sp.n. with the collectors No. FR 1353 of Herrn Ritter. FR 1365 has now been called Frailea asperispina sp.n. by Herrn Ritter. The photographs show that the Fraileas may be placed under the "Ground-Cacti". One will notice how the plant-body is pulled further and further into the ground. The habit and spines will show the specialist that here is a good and new species.

FR 1385c Frailea percumbilicata v. spinosior sp. et var. nova, is again a new species, and I am looking forward with great interest to the valid description. This plant is also with a fruit, and the flower may be yellow.

Finally, I would like to introduce Frailea albifusca sp.n. FR.1392. Here we find, without a doubt, a new and beautiful species. The longer, darker middle spines point upwards and are relatively thin, flexible and slightly bent at the tips.

I like to say in conclusion, that Herr Ritter with these new finds, has increased his new discoveries with some interesting species. I wish him for many years to come uninterrupted ability to work, in publicising many new species, and therefore furthering our spiny hobby.

* *

THE GENUS SUBMATUCANA BKBG. AND THE AREQUIPA-MATUCANA PROBLEM

By Dr. Albert Simo and Stefan Schatzl.

Translated from the 1964 G.O.K. Newsletter by R. Moreton.

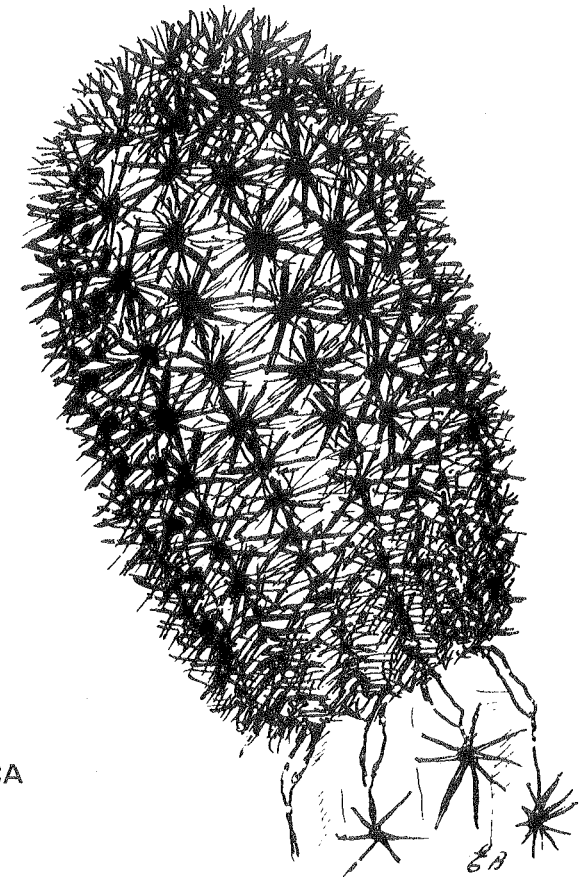
(Continued from the Chileans No.12 pp.98-101)

We have referred in the foregoing to the species of Backeberg's genus Submatucana which are in our culture, briefly described each species, brought out the points of recognition for each and given an analysis of the flower cross section, simply because they are of importance for our further consideration.

Whether any more of those found in that area in recent years belong to the genus we are unable to ascertain due to lack of acceptable material: so we still do not know Matucana formosa and its variety minor (FR 1073 and FR 1076). According to Buining, Borzicactus madisoniorum is really a Matucana (sensu Ritter). Although Prof. Rauh in his "Beitrag zur Kenntnis der Peruanischer Kakteen Vegetation" apropos the arrangement of the lines of development of Matucana proposes a Northern Inter or East Andean development group from which the species of Submatucana arise, he is unable to decide on the unquestioning acceptance of the genus Submatucana. He is of the opinion that further observations in the locality are required to confirm the setting up of this genus.

Ritter, who, through his one man collecting trips possesses the greatest knowledge among present day collectors of the South American cactus areas, rejects the genus, but recognises the genera Arequipa and Matucana as fully warranted. Kimnach has included in his collective genus Borzicactus amongst others, both Arequipa and Matucana.

A longish fruit which opens when ripe by means of a hole in the base, whereby the seeds are emptied in the woolly apex of the plant, are to Ritter the recognition points of the genus



AREQUIPA ERECTOCYLINDRICA
Collection — E.W. BARNES

MATUCANA INTERTEXTA
Collection — E.W. BARNES

Arequipa, whereas the typical fruit of the closely related Matucana opens by means of splits in the side of the fruit and he takes this as a fully acceptable generic distinction.

Since Submatucana also possesses the splitting fruit, all the previously mentioned plants are placed in Matucana.

Regarding the fruit of the three genera mentioned, only a few statements exist in the technical literature and the collectors shroud themselves in silence, although from these pages useful work may be carried out.

Prof. Rauh's statement about the fruit of Arequipa rettigii: "Ripe fruit up to 2.5 cm. long, yellowish, crowned by dried flower remains. Opens at the base and strews the matt black seeds in the apex of the plant". Fruit of the genus Matucana become club shaped, opening by several lengthways splits, that of Matucana elongata is given as globular, opening with lengthways splits. The Matucana yanganucensis group has been dealt with by both by Rauh and Backeberg without a description of the fruit.

In "Succulenta" 1963 Buining described Matucana mirabilis sensu Ritter and described its fruit as globular, light yellow with a few little hairs in the axils of the scales. The ripe fruit here opens by triangular splits, not as usual in Matucana by lengthways splits or by basal opening as in Arequipa. This unusual dehiscence in Buining's Matucana mirabilis is, so far, unique in the genera under discussion.

Britton and Rose described the flower of Arequipa as hairy, that of Matucana as naked, but Ritter found Matucana and Submatucana plants of the same species and in the same locality both with and without hair. On this evidence, Ritter, in contrast to Backeberg, places no value on the presence or absence of hair in these genera, although in his amended genus Chileorebutia and in Pilocopiapoa the presence of wool or spines is a fully acceptable generic characteristic.

Prof. Rauh does not mention Ritter's observations, although Rauh values nakedness or hairiness and allots it specific significance. Prof. Rauh's observations are that with several species of the genus Matucana woolly hair has been confirmed in the axils of the scales of the tube, whereby Backeberg's conception of Matucana, on the grounds of its short columnar growth and the flower tube formerly regarded as naked, as a vestigial Loxanthocerei group, finds support.

Some while ago, aided by a general examination of the flowers, we were able to establish a typical form for the stigma base and the arrangement of the nectary in the genera Arequipa and Matucana. The investigations were carried out on the flowers of Arequipa rettigii, A. erectocylindrica as well as fully developed flowers of Matucana haynii, M.elongata, M. cereoides, M.hystrix, M.multicolor and M.gigantea (FR nom.nud.) and proceeded without regard to nectary shape, which is only a species characteristic; uniformly, with the genus Arequipa it was found that the stigma base is not enlarged, the nectaries are predominantly in the nectary chamber wall or only slightly protruding therefrom. With Matucana the stigma base is enlarged - and the nectary tissue - on the lower side of the diaphragm.

As is shown by the cross sections of individual flowers, the conical widening of the stigma base is marked in Submatucanas aurantiaca, calvescens, currundayensis and the Hutchison species; in S.ritteri it is largely restricted to the lower side of the diaphragm. This restriction shows the intermediate position of Submatucana between Matucana and Arequipa, further that the species ritteri and paucicostata represent transitional forms, whereby in the former the characteristics of Matucana predominate, in the latter those of Arequipa. The type for the genus Submatucana is regarded as having the large nectary besides the nectary tissue overlapping onto the bottom of the diaphragm, as is the case for the majority of the plants examined.

If the peculiarities of the stigma and nectary of the three genera just pointed out are rejected as generic characteristics there remains only the fruit as a critical dividing characteristic as is employed by Ritter with the genera Arequipa and his genus Matucana. There now arises the question, are the two quoted forms of dehiscence always constant or are there variations here also? We could call into question firstly the previously mentioned Matucana mirabilis, in which the fruit splits into triangular sections when ripe. We take again a fruit of S. currundayensis which opens basally without the typical lengthwise splits and finally a seed capsule from an A.erectocylindrica recently arrived from South America, which in shape does not conform to that illustrated in Rauh's Peru Work but has a typical laterally splitting fruit, which however has a small hole in its base, from which the seeds emptied onto the top of the plant.

There is here then no absolute conformity in fruit behaviour available, so that Ritter's fruit theory cannot stand up to critical examination. The correct action should therefore be to drop the genera Matucana and Submatucana and replace them with the original Britton and Rose genus Arequipa, as has already occured in other quarters.

A large proportion of the professional botanists, especially systematists remain sceptical towards small genera, based on a few isolated characteristics. Despite the quoted disagreements, which however due to the great variability which exists among South American plants, should not be taken too seriously, we see the genera Arequipa and Matucana as fully substantiated, on the basis of the generic characteristics quoted in Prof. Rauh's famous Peru Work.

Since the characteristics for the genus Submatucana are not inferior in value to those of Arequipa and Matucana, if the first two genera are recognised, so must Submatucana be accepted as fully justified.

It will be seen that the authors attach a fair amount of importance to the fruits of the plants of these three genera and especially to the characteristic fashion in which they split to release their seeds. In view of the general reluctance of these plants to flower and set seed in Britain, here again is a field where comments and observations from members in Australia and New Zealand would be very valuable. - H.M.

* *

AREQUIPA

From Mrs.A.E. Howard, New Zealand.

Here in North Otago, New Zealand, we have cold winters with hard frosts (often 12 - 15°F of frost, rarely 20°F) but fairly dry atmospheric conditions, being in one of the low rainfall areas with an average of 22 inches annually. Arequipas seem to be very happy here, growing well and producing flowers spasmodically throughout the year. I keep my Arequipa in the greenhouse, which is not heated, so that the temperature inside falls down to 24°F in winter without harming the plants. They are all easy to grow and need no special treatment. I have them in full sun and give light waterings throughout the year.

Arequipa hempeliana is a small globular plant with an olive green body and strong ash grey spines with tips of pale brown. The new spines however, have a dark orange base with dark brown tips. The woolly buds open to flowers with petals of dark red edged with purple and having an orange throat.

Arequipa spinosissima is a globular plant so far and perhaps the most attractive. It has a mid-green body with straw coloured spines, the centrals tipped pale brown. The new spines are a rich ginger brown. Buds show first as white woolly tufts in the white woolly centre and open to flowers of vivid scarlet.

Arequipa K.142 is only about 9" tall as yet with a dull green body, ash grey spines the centrals tipped brown but the new spines at the top are bright orange red tipped brown. The flower is very large, opening wider than the others, a glowing dark red and very beautiful. This one flowers profusely.

Arequipa rettigii is about a foot tall, has a pale green body with spines pale yellow at the base and golden brown tips. The flower is red, rather similar to leucotricha.

The oldest plant in my collection is A. leucotricha, the main stem of which is fully two feet long and semi-decumbent, with three shorter stems about nine inches long and, at present, still upright. It is a very spiny plant with centrals of orange red tipped dark brown almost two inches long curved upwards. The almost cylindrical flowers borne at the top of the plant are dark carmine red, the style pale red and the stigma yellow.

The Arequipas are natives of Chile or Peru and all are short or elongated cylindric in form. The flower tube of all species is scaly and woolly.

COMMENTS FROM H. MIDDLEDITCH

This genus is named after the town of Arequipa in southern Peru. From the map on the frontispiece of the Chileans No.8 it will be seen that this locality is well up into the mountains - plants have been discovered at an altitude of 11,000 ft. Arequipa itself receives an average of 4" of rainfall a year and few species of Arequipa are likely to receive much more than this in habitat.

In his Kakteenlexikon Backeberg gives the following species of Arequipa:- erectocylindrica, hempeliana, leucotricha, mirabilis, rettigii, soehrensii, spinosissima, weingartiana.

Whilst the preceeding article has dealt with the close relationship between Matucana and Arequipa, it is interesting to note that Backeberg himself discovered a plant in northern Chile in 1931 of which he published the description in 1938 as Oreocereus variicolor, amending this to Arequipa variicolor in Vol.II of Die Cactaceae and further revising it to Oreocereus variicolor in his Lexikon. The reason for this is simply that this species has characteristics some of which resemble Oreocereus and others are close to Arequipa. It is because of the fineness of the dividing line between Matucana, Arequipa, Oreocereus and other genera (Loxanthocereus, Bolivicereus, Morawetzia and Borzicactus) that Kimnach has suggested recombining them into Borzicactus. Further comments on these plants, especially on flowers or fruits, would be very welcome.

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PHOTOGRAPHING CACTI - 2

It was suggested in the previous article (Chileans No.12 p.108) about photographing your cacti that it was most desirable for the plant being photographed to fill the picture, avoiding both the extremes of cutting off spine tips or having a great deal more background than plant.

For the plant to fill the picture, the camera must often be brought so near that it is closer to the plant than the minimum distance at which the picture is in focus. This then requires some additional fittings to be used so that the picture may remain in focus at the close-up range.

Basically there are two different methods of equipping a camera for close-up work - one method for single lens reflex (S.L.R.) cameras and the other for cameras with direct viewfinders.

CLOSE UP PHOTOGRAPHY WITH A DIRECT VIEWFINDER

By D. Angus

In order to equip a direct viewfinder camera so that it can be used for close-up photography, supplementary lenses are used. These are about the same diameter as the camera lens and are secured to the front of the camera lens holder when in use. They cost round about 15/- to 20/- each. The supplementary lenses most usually used are either No.1, No.2, or No.3 dioptre; the larger the number of the lens being used, the closer may the camera be taken to the plant while keeping the picture in focus. For even closer work, more than one supplementary lens may be attached to the lensholder.

In a direct viewfinder camera, the viewfinder is usually above the lens and often offset to one side. This means that the picture taken by the camera lens is offset from the view seen in the viewfinder: when the camera is a yard or more away from the plant, this parallax effect is hardly any problem, but it is essential to allow for parallax in close-up work with this type of camera, more especially when a supplementary lens or lenses are in use.

The second problem associated with this type of camera - and again more especially when supplementary lenses are being used - is in ensuring that the subject is in focus. Both these problems can be dealt with easily by taking a few experimental photographs at the outset.

Suppliers of supplementary lenses are often able to provide a chart giving the limiting distance at which subjects are in focus, at each camera setting, when using one supplementary lens. In the absence of this chart, or when using more than one supplementary lens, the precise parallax effect and the limiting distance at which the picture remains in focus, must be determined by experiment.

To determine the limits at which the picture is in focus for a given camera setting (this is the 'depth of field'), the easiest method is to take a photograph of a six foot steel tape laid out straight ahead of the camera, starting either at the camera body or the lens - whichever spot is to be used in future for measuring distance to the plant. It is advisable to take two photographs, one with the camera set at infinity and the other with it set at its lowest focusing distance. From the resultant photographs both near and far limits between which the picture is in focus can be read straight off the rule.

My photographs from this experiment with a direct viewfinder camera with a 45 mm. lens, using two No.3 dioptre lenses, showed that the distance to the plant should be $5\frac{1}{2}$" from the front of the lens and that there was acceptable focus from $4\frac{3}{4}$" to $6\frac{1}{4}$", at f 22 and minimum focus. With the camera set at infinity, the best distance for the plant was $6\frac{1}{2}$" with clear definition from $5\frac{3}{4}$" to $7\frac{1}{4}$".

It is also necessary to experiment in order to determine how much to allow for parallax; at the same time it will be possible to learn the exact field of view at each of the distances determined by the method described above. It is necessary to do this as the field of view taken by the lens does not match that seen in the viewfinder. A simple pair of crossed lines should be marked off on a stiff board, numbered at each inch either way from where they cross. A photograph should then be taken of the board, at each distance previously determined, centering the viewfinder at the centre of the cross. It may be necessary to mark off a cross at the centre of the viewfinder with water paint, if none is provided.

The photograph taken in this way, with one No.3 dioptre lens, gave a field of view measuring 6" x 4" whilst the centre of the cross was 1" above the centre of the picture. Thus to compensate for this amount of parallax, the camera would be positioned so that the plant pictured in the viewfinder appeared to be 1" low. This will put it in the centre of the picture taken by the lens. With two No.3 dioptre lenses on the camera, the field of view measured only $3\frac{3}{4}$" x $2\frac{3}{4}$" whilst the centre of the cross was at a point only 1/8" below the top of the picture. To compensate for parallax at this setting, the camera would be positioned so that the plant as seen in the viewfinder appeared to be $1\frac{1}{4}$" low.

A ruler may be used to set the plant at the correct distance from the camera, when using supplementary lenses, but it is easier and more accurate to cut pieces of wood to represent each subject distance to be used.

When setting up the subject and camera it may appear rather Heath Robinson to be waving these sticks about but you should be able to take remarkably good close-up photographs - without the need to obtain expensive equipment.

(Actual slides taken when determining close-up settings may be borrowed from our Slide Librarian - please send a S.A.E. with 6d stamp (U.K.) or P.O. for 2/- (overseas).

CLOSE-UP PHOTOGRAPHY WITH A S.L.R. CAMERA - EXTENSION TUBES

By A.W.Craig

In the previous article the use of extension tubes for close up work was referred to and the use of these together with the need to adjust camera settings when using these will now be considered.

The one big advantage of the interchangeable lens system is that it permits the negative to be filled with the picture every time, this being particularly important in our sphere of photography.

In all close-up work - whether using bellows, supplementary lenses, or extension tubes, there is little depth of field so consequently small apertures and long exposure times are recommended to facilitate as much of the plant as possible being in focus. Even the limited depth of field can be turned to our advantage in certain circumstances e.g. when attempting to photograph a plant which is growing with many others in an open bed in such a way as to prohibit the use of a backcloth. The background can then be blurred completely so as not to detract from the subject.

When a lens is extended beyond its normal working position, by means of tubes or bellows, the effective aperture is no longer that which is engraved upon the lens barrel; this is due

to the magnified subject size and hence decreased light intensity. The effective aperture is altered according to the law of inverse squares and the required increase in exposure can be obtained from the following formula:-

$$\text{Exposure Factor} = \frac{(\text{Extension length} + \text{lens focal length})^2}{\text{Lens focal length}^2}$$

Taking a simple example, with a 50 mm lens, using 50 mm length of extension tube, the exposure factor is then $\frac{(50 + 50)^2}{50^2}$ which equals four - that is, the exposure must be set at four times that indicated by the lightmeter.

These calculations may appear rather involved at first glance - too involved to carry out before each photograph, especially when visiting another collection and time is limited, but for any given focal length of lens the alterations in aperture are constant; thus a table can be drawn up giving exposure factors for any combination of extension tubes that may be used.

Thus for a 50 mm lens:-

Length of extension tube(s)	10 mm	20 mm	30 mm	40 mm	50 mm
Exposure factor	1.4	2.0	2.6	3.2	4.0

For anything except macrophotography 50 mm of extension tubes is all that will be required. Three tubes will cover this length so that exposure factors for only seven combinations will be required.

There is now room in the second photographic Robin for one or two further participants and members using a direct viewfinder camera would be equally welcome. See last page for address of Robin leader. - H.M.

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FURTHER EXTRACTS FROM THE PHOTOGRAPHIC ROBIN

As a means of getting a good picture the use of a tripod is generally commended, to keep the camera rock steady and avoid any loss of definition arising from camera shake. The use of a tripod permits the use of longer exposure times and smaller apertures, as the smaller the aperture (large/f number) in use the greater is the depth of field, thus increasing the chance of getting into focus both those parts of the plant in the field of view which are nearest to the camera and those which are farthest away.

In order to get the plant to fill the frame - and even more so when it is a matter of a close-up of part of the plant (perhaps just the flower) - it becomes necessary to use either a supplementary lens or extension tubes. Most members of the Robin use single-lens reflex cameras with extension tubes and Bob Hollingsbee offers a quotation from Amateur Photographer in support of this system - 'The reduction in aperture (effective f number) brought about by extension tubes does give an increase in depth of field, which is an advantage compared with obtaining the same magnification ratio by using supplementary lenses. Thus, for a 2 to 1 magnification, the use of extension tubes reduces a nominal f 22 setting to an effective f 66, whereas supplementary lenses leave the effective f number at 22. The depth of field is therefore three times greater with the extension technique".

As the use of extension tubes reduces the amount of light entering the camera, this is equivalent to stopping down the aperture, i.e. it reduces the effective f/number. Thus the exposure and aperture figures read off the lightmeter must be adjusted for the length of extension tube in use and much discussion has taken place in the Robin on this subject.

An alternative method of adjusting light meter readings when using extension tubes is put forward by Cecil Baxter, who suggests setting the light meter at an adjusted film speed, so that the exposure and aperture read off the light meter is then correct for the length of extension tube in use.

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THE SLIDE LIBRARY

During the past year, over 150 slides have been added to the slide library. We should like to acknowledge receipt of slides from the following members:- D.Angus, P.Beeston, N.L. Browne, A.W.Craig, A.P.A.Demaid, Mrs.J.Hobart, R.E.Hollingsbee, D.J.Lewis, A.J.S. McMillan, H.Middleditch, R.B.Sharpe, P.H.Sherville, W.G.Sykes, W.Withers. We are especially grateful to those who have donated slides to the slide library.

Only very few slides are available of Matucana, Oroya and Islaya - duplicate slides of plants of these genera would be especially welcome: naturally we shall always be pleased to receive any slides of other South American cacti.

Some genera are only represented by a few slides in the slide library; there are half-sets of Gymnocalycium, Notocactus, Parodia, Sulcorebutia and Copiapoa, and we have two full sets of Neoporterianae. We should be very pleased to hear if you have borrowed any slides to compare with your own plants and find any distinctive difference in body form or flower.

When requesting the loan of slides please indicate when they are required; slides should not be retained for a period in excess of ten days as other members may be anxious to consult them.

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ERRATA

It is to be regretted that quite a considerable number of printing errors crept into our last issue. Additionally, readers will have observed the incorrect spelling of Notocactus (ex-Parodia) buenekeri which was on the inside front cover.

GRAFTED SEEDLINGS

It is anticipated that by the time that this issue is in your hands, we may have a few grafted seedlings available, mainly less common species. To minimise double carriage charges these will be available from our slide librarian rather than the seedling pool: members who care to send a stamped addressed envelope to the slide librarian (A.W.Craig) will receive a list of plants available when these do come to hand.

TRANSLATORS

We now have a fair backlog of useful and interesting articles on South American cacti, to be translated for 'the Chileans'. As all our translators are already heavily engaged, I should be very pleased indeed to hear from any members who feel they can translate, or obtain translations, from either Dutch, German, Polish, Czech or French.

H.Middleditch

STUDY GROUPS / ROUND ROBINS

English	Cleistocacti	A.A.Sadd, 26 Carlisle St., Island Bay, Wellington S.2, New Zealand.
	Copiapoa	D.J.Lewis, 16 Brundall Crescent, Cyntwell, Cardiff CF5 4RU.
	Epiphytes	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ.
	Frailea	J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland.
	Gymnocalycium	G.H.Swales, 5 Hillcrest, Middle Herrington, Sunderland, Co. Durham.
	Hydroponic Culture	P.R.Hallett, Llaregyb, 20 The Garth, Bull Bay, Amlwch, Anglesey.
	Lobivia	R.E.Hollingsbee, 46 Markland Road, Dover, Kent.
	Matucana/ Borzicactinae	Contact the Chileans.
	Mediolobivia	Mrs.C.S.Winsland, 6 Acacia Grove, St.Neots, Hunts.
	Miniature Opunita	D.E.Watling, 52 Frances Road, Windsor, Berks.
	Neoporterianae	H.Middleditch, 5 Lyons Avenue, Hetton le Hole, Co.Durham.
	Notocactinae	K.H.Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton
	Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lincs.
	Photographing Cacti	A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees, Teeside.
	Sulcorebutia	W.G.Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs.
	Trichocereus	N.T.Hann, 30 Copse Avenue, West Wickham, Kent.
German	Chileans, Echinopsis, Epiphytes, Gymnocalycium, Islaya, Parodia, Rebutia and Lobivia - W.Kinzel, 53 Duisdorf/Bonn, Bonhoefferstrasse 16, West Germany.	

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