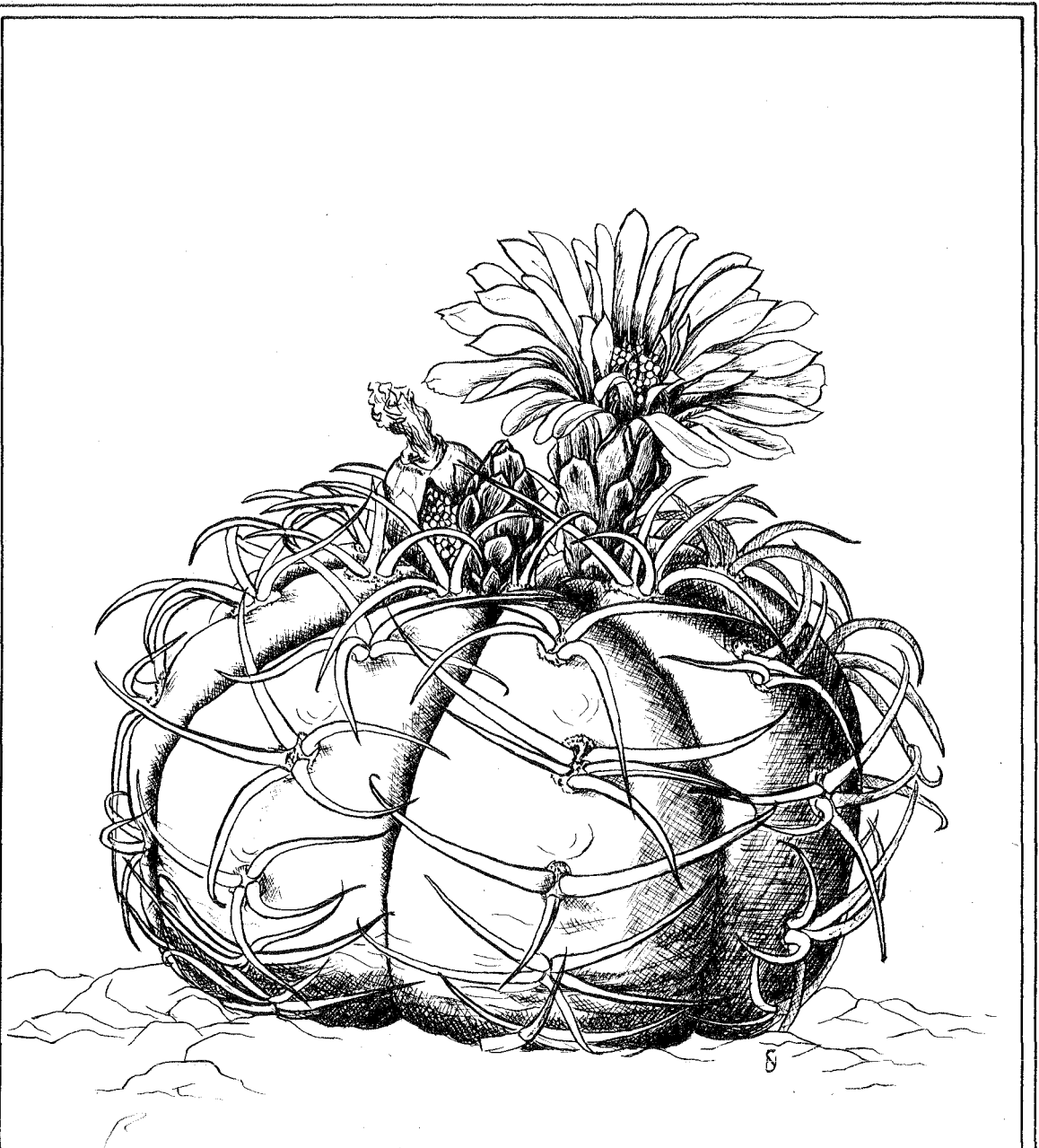


THE CHILEANS '71

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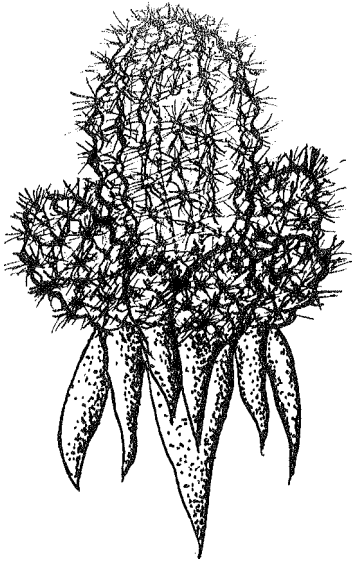


GYMNOCALYCIUM CARDENASIANUM

COLLECTION - G.J. SWALES.

ACTUAL SIZE - IMPORTED PLANT

Nancy Swales.



PYGMAEOCEREUS AKERSII

Full size.



PYGMAEOCEREUS BYLESIANUS

LAU 243

Full size.



SETIECHINOPSIS MIRABILIS

Fruit - Full size.



PYGMAEOCEREUS DENSIACULEATUS

Fruit - Full size

MORE ABOUT PYGMAEOCEREUS

In his original publication of the genus *Pygmaeocereus*, in the N.C. & S.S. Journal 12.4: 1957, Curt Backeberg stated that these plants were "believed to develop a robust turnip-like root in habitat, but in cultivation having a more slender root system".

Further experience with both imported and cultivated plants would suggest that this genus may be, with certainty, counted amongst those whose roots do take on the form of a swollen tuber. Not only does this occur in habitat, but cultivated specimens also seem to form a root of this type over a period of growth. Five different species of *Pygmaeocereus* were observed in the collection of B.C.F. Hill, each one having developed swollen root tubers to a greater or lesser degree during their time in cultivation.

Amongst these five plants was a *P. bylesianus* which was grown from de Herdt's seed by the plant's owner; the seed was sown in 1963 and the plant produced a flower in 1967 when only about 20 mm high. The swollen nature of the root was found when the plant was repotted. Between the aerial body and the swollen tuber there was a slight reduction of diameter forming a neck between the two parts, but this neck was far shorter and stouter than the long, thin, scraggy neck shown on the accompanying sketch of an imported plant. One might suggest that this slender neck is a feature of wild plants but is not likely to be found in so pronounced a form in cultivated plants. On the other hand, the swollen root on the cultivated plant resembled quite closely the shape of the root of the imported plant illustrated here, for the main body of the root divided into several carrot-like descenders, the whole being rather stumpy as opposed to long and thin. However, the surrounding pot might have had an influence here.

The other four plants observed in the collection of B.C.F. Hill were rooted cuttings imported from Johnson in America, who was the first recipient of plants of this genus from habitat. There would therefore seem to be a fairly good chance that these particular plants are correctly named.

One of these four species was *Pygmaeocereus vespertianus*, received as a single-headed import about 25 mm long. As the stem increased in length by about this amount each year in cultivation, it soon started to grow at an angle, taking on a natural lean without (as yet) becoming decumbent. The spines were all very short on the plant as received, but on the new growth in cultivation numerous areoles have produced central spines of over 20 mm in length, creamy white in colour shading erratically to a dark brown tip. A few areoles have produced two centrals, the upper one being about half the length of the lower. After the plant had become established and produced the crop of long spines on the new growth, it also flowered; slides of these flowers show that the outer perianth leaves (petals) had a broad brown mid-stripe and an infusion of brown coloration over most of the width of the petals; the petals were also very strongly reflexed over most of their length, a feature not depicted by Buxbaum in his sketch of this flower which was reproduced in *Chileans* 4.16: p.16. From the slides of the flower, the petals would appear to be a little broader than those on *P. bylesianus*. Very similar shaped petals can be seen on the illustration forming Tafel 99 of Backeberg's *Die Cactaceae* Vol. II. On both these counts, therefore, it seems that the plant depicted in this illustration is more likely to be *P. vespertianus* than *P. akersii*, as suggested by the title to the illustration.

Two other imported species seen in the B.C.F. Hill collection were *P. nycticalis* and *P. napinus*; both these plants had an elongated, decumbent stem, quite distinct in character from *P. bylesianus*. Both plants were about 120 mm (5") long; *nycticalis* had remained solitary but *napinus* had produced six small offsets from around the base. When potted up on receipt - and for some time thereafter - attempts had been made to retain both stems in an upright position, but it became apparent that the plants preferred to adopt a decumbent mode of growth. Both plants flowered in cultivation, their flowers being generally similar to those of *P. bylesianus*.

The fourth import grown by B.C.F. Hill was a *P. akersii*. All the spines were quite short - perhaps three or four mm long or less - and pale creamy white in colour. The plant offsetted freely

from the base in cultivation and carried 15 heads, almost all the same height and thickness. The main stem possessed a fairly thick rootstock, but the offsets had just started to put down aerial roots about 1½ to 2 mm thick, towards the soil.

Several examples of this plant have now been seen in various collections, all similar to this direct import in appearance and habit. The illustration entitled "*P. bylesianus*" in Backeberg's *Die Cactaceae Vol. II, Abb 1218*, is very similar to these plants and it would seem probable that this illustration is incorrectly titled.

The accompanying sketch of *P. akersii* from the collection of E.W. Barnes shows each of the offsets developing its own thickened root stock; this particular characteristic has not been reported by any other growers of this species.

Another example of this species was seen in the collection of R. Martin, this time with 21 heads, mostly of comparable height and stem diameter; the shorter stems appeared to be the newest off-sets. At first sight the spines gave the impression of being very dark brown at the tips, but when they were examined under a hand lens, it was found that only the centrals were dark brown, a great many being dark brown only at the tip. Once this feature had been observed under the hand lens it was possible to discern it with the unaided eye, knowing what to look for.

An imported specimen of *P. bylesianus*, ex-Sargent, was seen in the collection of P.G. Waterman; this plant had a solitary body slightly elongated-globular, 22 mm in diameter by 30 mm high. This was attached by a very thin neck of only some 4 mm diameter and about 40 mm long to a substantial thickened rootstock - this being about 50 or 60 mm broad at its thickest part, breaking into two thick descending carrot-like sections. The overall length of the root was 100 to 120 mm.

The *P. bylesianus* shown on the accompanying sketch also exhibits this feature of a long thin neck; indeed, it almost looks as if this particular plant has had a previous aerial body which has become detached and left just a stump on the root. This neck is so thin and weak in comparison with the body and root sections that it is hardly surprising that it has either shrivelled up in a drought or else been broken by a browsing animal or by a flash flood. It is rather remarkable that imported plants can survive with the body and the root parts still joined together after the rigours of collection and transportation. Of the plant depicted on the sketch, E.W. Barnes says:- "From the sketch of the plant you will note that the growth comes from the 'nodes' just as in *Neoporteria* etc. with just the same sort of neck, topped with a diminutive head. The one in the sketch is fully mature with a number of old flowering areoles in evidence. It did in fact have a bud on receipt (when I unpacked it from the crate from Lau at Dennis Sargent's) but it failed to mature.

"This plant grows along with *Islaya divaricatiflora* Lau 150 in the Camana fog zone. I procured about half a dozen of these plants, most of which took about six weeks to root, losing the top growth in the process, but new shoots are now appearing at the base of the old heads and one plant has produced a new 'runner' from the buried portion of the plant body which, on breaking the surface of the compost, begins to swell out and become green. It is interesting to note that this runner pushes its way to the surface curled over like the flower bud of a winter aconite, and only upon reaching the surface does it straighten out. I suppose by this means the shoot is more able to force itself through the hard-packed surface layers of the soil in which the plant grows".

Presumably, as the buried 'root' is able to grow a new head in this way, then either the upper part or else the majority of the buried portion is strictly speaking not a root, but is botanically a buried stem.

Two further examples of imported *P. bylesianus* were seen in the collection of A.W. Craig, which had lost their aerial heads and were in the process of producing new offsets from the shoulders of the root tuber (or underground stem). The new growth produced in cultivation on a further imported plant in this collection was remarkably similar to the original habitat growth. Another limb of this species, grafted to a stump of *Cereus pachanoi*-type stock, had grown to about 7" in height and again the habit of the new growth was remarkably similar to that of the habitat growth - with one exception. At the close of the second season of growth in this manner, three fairly strong centrals about 10-12 mm long appeared from the upper part of the plant, their lower half pale,

shading to a dark brown tip. This poses a nice problem; is it the effect of growing on a grafting stock that has led to these centrals being formed? Or is it the size to which the limb has grown? Up to the present, the presence or absence of long centrals has been considered a means of differentiation between species in this genus; if their appearance on this plant of *P. bylesianus* cannot be ascribed to cultivation on a graft then it adds a further complication to the problem of identifying species in this already somewhat confused small group of plants.

The plant of *Pygmaeocereus densiaculeatus* depicted in flower in the Chileans No.16, set seed and produced a reddish, globular fruit. This fruit is shown in the accompanying sketch by Mrs G.Craig where it will be seen to be quite different in size and shape - as well as colour - from the fruit of *Setiechinopsis*. This is in marked comparison with the basically similar morphology of the flowers so well depicted by Buxbaum in his article reproduced in that issue.

We should like to obtain examples of seed of *Pygmaeocereus* and *Arthroocereus* in order to be able to make a comparison between these two genera and also *Setiechinopsis*; half a dozen seeds would suffice for this purpose and any species would be most welcome.

H.M.

The slide Library has both *P.densiaculeatus* & *P.akersii* in flower - A.W.C.

EXCURSION "CACTUS" '69 - PART 2 by Nelida A.Serrano

(Translated from C.C.C.C. (Argentina) IV: 4. 1969 by H.Middleditch).

On the following morning, as agreed, we arose at 6.00 a.m.; we took breakfast half an hour afterwards and then we started for La Rioja. We had thought of starting earlier, but as all were tired the general opinion favoured rising at this hour, which gained us another hour of daylight.

We left, then, at 7.00 a.m. in the direction of La Rioja, having as our objective Los Cerros Colorados - we almost left in Cruz del Eje one H.Villa together with our partner Cadet G. Gonzalez, who had gone into the centre to buy a roll of film; fortunately we recovered our lost passengers and departed.

The highway is a single flat ribbon of asphalt, very well maintained and with little traffic, probably because it was Saturday or else on account of the earliness of the hour. The countryside appeared quite monotonous, with thickets of thornbushes (*Prosopis* sp.) and stunted vegetation; further on, when leaving the vicinity of Soto, we saw the famous olive groves. The places which were practically deserted and the small town of Serrezuela, where the coach stopped to take on fuel.

Taking advantage of this stop, I disembarked with my camera to take some views of the town and, remembering that R.Kiesling was going to give a lecture on *Opuntias*, photographed a group of *Opuntia ficus-indica* which was growing besides a fence. When I had finished taking the photograph the noise of the engine brought me back to reality - they were departing and I was left behind! Alarmed and worried, I went towards the service station to see if some vehicle could be obtained. When I was in conversation with a family who were going towards La Rioja in their car and who courteously offered to help, an employee of the garage informed me that the coach had been stopped and was waiting for me: what a relief! They had noticed my absence and so it was no more than a scare after all.

The highway was rolling away and although the topography was level with the similar type of vegetation, now and then we saw large clumps of *Opuntia quimilo* and their usual companion - the majestic *Stetsonia coryne*. That landscape is defined geographically as "Chaco", and some specimens attain enormous dimensions, with the appearance of trees of more than 6 meters in height

and with stems disposed in the form of ascending branches, sometimes as many as 50.

The nearer we came to the Salinas and the boundary of the Province of La Rioja, the sparser became the vegetation, whilst stretches were made up of *Opuntias*, *Stetsonia*, *Cereus* spp. and *Trichocereus* spp. with some *Cleistocactus* and *Harrisia*. Finally we saw among the *Stetsonia* some stems with the uppermost portion cristate; we wanted to stop and look at them close to and take some away; however, bearing in mind that we could be appreciably delayed, it was decided not to stop in this region but leave it until the return journey, provided we had enough time.

In the middle of the crossing of the Salinas the vegetation became very sparse indeed, only some bushes of about 30 cm in height and discernible between them the halophytic succulent, *Salicornia* sp. with the ground in places covered with white patches owing to the great amount of salt present.

In this part the Salinas has a breadth of only some 10 or 20 Km. On entering the Province of La Rioja the vegetation becomes more plentiful but with similar typical features as in Cordoba: *Prosopis* sp., *Stetsonia coryne*, *Opuntia quimilo*, etc. Further onwards we came upon small clumps of *Tephrocactus* (*T. articulatus* v. *calvus*) without spines or flattened centrals, much wrinkled and of a dark grey-brown colour.

At the suggestion of a group of members it was decided to make a halt in order to look at the surroundings where we had seen groups of *Tephrocactus*. I cannot place this spot now, but I believe that it was a few kilometers from "El Chamical". There we found great quantities of *Tephrocactus articulatus* var. (flattened centrals, long, whitish, some darker), some varieties with larger joints, others with thick areoles of orange - yellow colour; yet others with papery central spines - probably *T. articulatus* v. *papyracanthus*. Intermingled with these, there were fine examples of *Echinopsis leucantha* which still preserved the remains of their dried flowers - it must have been quite a spectacle to see them in flower. These plants reached a remarkable size - some of 200 mm quite globular and others more elongated, almost 800 mm or more in height. Some specimens had their spines much longer, black in colour and with the tips curved towards the top, crossing over each other, other plants with spines also long and black but almost straight - I do not know if it is a matter of differing varieties for it is the only characteristic feature that I noticed.

I found an example of *Gymnocalycium* which I have not yet been able to identify, of globular shape, bright pale green colour and spines thick and short, of beige colour with brown tips. Another specimen similar to the preceding description was discovered in the vicinity of Capilla de Monte but until now I had not been able to determine to which genus it belonged. This example is larger, with the ribs well defined, the spines smoother and of cream colour with a reddish tint at the edges and of about 10 mm in length.

In addition, we came upon great quantities of *Opuntia sulphurea*, also *Dyckias* which were growing as isolated individuals, with long and narrow leaves of grey colour with a reddish tint on the reverse: *Trichocereus*, probably *T. strigosus*, quite large and with brown colour spines, reddish at the tips; *T. spachianus* of much smaller dimensions and with yellow spines.

There were some groups which appeared to be scorched in the middle of the plants but we did not know if it was a natural cause or by intention.

For the moment, to bring in an anecdote. Just as I was getting ready to photograph a most handsome formation of *Trichocereus strigosus* with their long reddish spines shining in the sun, I noticed something in the field of view in my camera which apparently detracted from the appearance of this clump - what was it? Well, it was nothing less than our dear partner Cadet G. Gonzales whom I had forgotten about. With this event I can verify that at times photographs serve not only as useful for recording a cactus or the countryside but also for discovering lost objects. Since the same varieties and species kept repeating, we decided to carry on towards our objective.

About here the road narrowed to a single lane, but this was not a serious inconvenience as the traffic was rather light. What was not so enjoyable was the surprise which awaited us further on, where the stretch of road was under construction and the coach had to move over to the side on the earth. You can imagine the clouds of dust which were raised every time we passed a vehicle coming the other way.

About 11 a.m. we arrived at Patquia more or less 230 Km from Cruz del Eje and 32 Km from the Cerros Colorados. We made a brief stop at a bar beside the road to revive ourselves with drinks and to get a little cooler. Some of the travellers went ahead to investigate some ground nearby and our cactophile's eye could see great numbers of *Tephrocactus* spread all over the place, to such an extent that it resembled a cultivated field.

This was due to the fact that they can be easily broken into pieces and the cattle trample on them or knock them, scattering them about. In that spot we came upon *T. articulatus* v. *inermis* and other intermediate varieties. They were entirely buried in the sand and only the tips of the spines were exposed, which as everyone should know are lengthy, sharp, and quite hard.

Soon, but a single kilometer farther on we saw the first outliers of the famous Cerros Colorados. The landscape became more fascinating to us at every turn. The spectacle of the hills eroded by wind and water is really indescribable. The stone has taken on shapes of columns in the manner of a fortress and the colour emphasises the high relief even more since it is in a dark red brick tone. The whole place is of an unfailing beauty which contrasts sharply with the deserted countryside and it is very difficult to describe on account of the magnificence which was all around. It made us ask the guide to stop the walk so that we could look around. We were so absorbed with the landscape that we nearly did not notice the vegetation until the appearance of the first *Pyrrhocactus* reminded us that we were cactophiles before all else.

And so we had arrived at the famous "Cerros Colorados" - a historical place where the "Chaco" Penaloza took refuge nearby with his group of mounted revolutionaries, in the caves which take his name. Lamentably the walls of the caves have been daubed and written on by tourists who have wanted to record their passage through the spot; these inscriptions take away the beauty of the brick coloured stone.

Once settled, we ate our picnic luncheon before starting to explore. After we had photographed the moment for the record, we scattered to observe the flora of that place. Some of the younger and more intrepid managed to get up to the summit of the hill straight away. For my part I decided to penetrate further to the west where lay a small quebrada. I noticed that the cacti there were very few, only clumps of *Trichocereus strigosus*, tiny in size and rather battered, some with broken stems and others dried up. Mingled with these there were to be seen large numbers of *Tephrocactus alexanderi* with pale yellow spines and also clumps of *Dyckias*, quite large and dense.

As this place offered no attractions, I decided to walk towards the north; the terrain there was more level - a kind of valley - with a low hill and the ground entirely sandy, of brick colour. There I came across the first example of *Pterocactus tuberosus*, quite by accident as I had stopped to put right the leather strap of my bag. The plant was entirely buried in the sand and only exposed one small stem, practically dehydrated. By digging it up I was able to check that the tuber of the plant was approx. 150 mm in diameter and quite long. I continued hunting but was unable to discover any other specimens. Continuing my exploration, I began to see great numbers of *Tephrocactus* with whitish spines, probably a variety of *T. alexanderi* and between them, a clump which had only one central spine, black in colour, longer and twisted, the radial spines being of whitish colour.

Following the track I came across B. Conjian who was carrying a handsome specimen of a cristate *Tephrocactus*, which he proudly showed me, and a specimen of *Setiechinopsis mirabilis* he had just collected. I would never have recognised it had I not been told as the appearance of the plant was altogether different from the seedling I have in my collection - the colour was dark violet brown, with the central spines long and black, the stems very slender and wrinkled

which easily led one to be confused over the spines.

B.Gonjian showed me where I could find examples of *Pyrrhocactus bulbocalyx*. There they were, behind me on a little hillock some 30 m high. I went there to search for a specimen not too big, as such plants are difficult to establish. I took some photos of large clumps of which there were many there, but most of them had been knocked over and their roots were dried up.

Below the hill I carried on with the search for *Setiechinopsis mirabilis*, commonly called the "flower of prayer" and my efforts were quickly rewarded; I found small plants almost covered with sand and next to them, also buried, there appeared the first *Gymnocalycium bodenbenderianum* (the colour reddish like the ground), flat and circular with their ribs laid out in the form of radii and their spines entirely adpressed to the bodies of the plants.

I continued towards a group of *Trichocereus terscheckii* - rather odd because there were only three specimens altogether in the valley: their appearance was faultless and they were of a considerable height, between 2 - 3 meters and their diameter was 500 mm or more. What attracted my attention most strongly was that they were the only examples in all this locality. I collected some *Lobivias* there and finally returned towards the spot where the coach was parked when I came across Snr.H.Villa who had in his hands a plant which really drew the attention of all who were there. Never had we seen the like before: it was possibly a species of succulent similar to *Portulaca* - the stems were round, of green colour, the leaves were fleshy and of bright green colour too. He told us that it was the only plant which he had come across in all that locality.

I still hadn't got anything to examine so I went off in a northerly direction, alongside the railway line - there I came across F.Eckmayer who was taking an interest in a discovery of a *Lobivia* specimen. It appeared to him that it was growing like *Pterocactus* and then I saw them in larger clumps with their stems well developed - later a group of members collected more plants in order to divide them up between those who had not found them.

Whilst we were searching for *Pyrrhocactus*, I found a handsome specimen of *Echinopsis leucanthus*, spreading out and which had two heads on one of its off sets. There and then I dug it up with much care so as not to damage it.

On our return, we joined the group of Hilda Alvarez Angelica and R.Kiesling, to whom we showed our discoveries. R.Kiesling was very interested because he wished to check whether the species of *Pterocactus* lost their aerial stems or not in the winter, maintaining only the root; this was verified from the specimen as, although it had joints connected to the tuber, they were generally very dry and detached themselves from their "papa" in spite of all our care. Some stems were not quite as dry and seemed to have sprouted recently.

We were satisfied and we decided to begin the return trip; it was about half past four - in three hours we had discovered easily about 15 different species.

We travelled back along the route in the hope of making a brief halt in the region of the Salinas, but when we arrived there it was already becoming dark. It was left for us to explore this locality at another opportunity.

Once more in the hotel and during dinner we presented to all the tourists, including the three couriers who accompanied us (who were converted to cactophiles during the trip) the specimens of *G.capillaense* which we had collected at Villa C.Paz.

On the following morning, the 17th, we began the return to Buenos Aires. We left Cruz del Eje at 8.00 hours. After a few kilometers travelling we stopped at a spot in which were large numbers of *Stetsonia coryne* and *Trichocereus* in order to take a photograph of the entire party. For this purpose we chose a many-branched specimen about 5 meters in height. The diameter of the stem was 800 mm or more and one of the highest stems exhibited the classical fan shape of a cristate.

We took advantage of the stop there and, as always, keen cactophiles, we checked as many plants as there were around us; we found two varieties of *Cleistocactus*, one of them probably *baumannii*, a species of *Harrisia* (*pomanensis*?), a distinctive example of *Gymnocalycium* and one

variety of *Dyckia* much resembling that found by the road to La Rioja. In addition, other members of the party collected dry stems of *Trichocereus*, intended for future decoration and great numbers of *Tillandsia* spp.

Presently, after more than 17 hours of travelling had elapsed which we shared in a pleasant and cordial manner between all members of the party, there came to an end the first excursion organised by the C.C.C.C. "departing with thoughts of returning".

Comments from H.Middleditch.

My first reaction to the above article was that, with the sort of timetable and travelling hours that the party was following, they must have been doing some training for joining one of our Tours.

The article is both interesting and tantalising: it offers a picturesque description of the conditions under which the plants are to be found growing, but there is very little indication whether one may consider the observations typical of a larger region or just peculiar to the spot concerned.

The observations made of plants more or less buried in the ground are remarkably similar to those made by van Vliet on *Gymno. ragonesei*. One wonders whether the burying is done by wind-blown sand in the dry periods or by the earth which is washed away and re-deposited during a thunderstorm.

PYRRHOCACTUS BULBOCALYX by B.K.Boom and A.M.Wouters

(Translated by W.W.Atkinson from *Succulenta*, September 1963)

This is an exceptionally beautiful species, not too large growing, blue-green in colour, of regular form and thickly (white) spined. The body is spherical to egg-shaped and has 10 to 14 ribs divided into large warts, each with 10-15 fairly long (to 2 cm) stiff, slightly bent spines, which are white to grey, sometimes also reddish.

The flowers occur in the summer near the top and grow from the areoles just above the base of the spines, and they have the typical urnshaped form of *Pyrrhocactus*. The outer petals are curved outwards in such a manner that the flower shape answers perfectly to the name "bulbocalyx" (bulb-shaped calyx). The ovary is thickly scaled and covered with white, woolly hairs. The petals are light yellow and the throat of the flower is red.

This species was until recently only occasionally seen in collections, and those in cultivation were almost exclusively originated from the nurseryman Hr.Jansen of Loosduinen. This form grows very compact and has lovely pink-purple spines. We (Wouters) obtained a plant from De Laet of Contich, near Antwerp, under the name *Echinocactus straussianus*, which on due study appeared to be *P.bulbocalyx*. This specimen has slightly straighter spines and is a much darker green in colour. The flowers are yellowish white and less clearly urn shaped.

For several years F.Ritter has offered seeds of *P.bulbocalyx*. These plants have not yet flowered for us, but from their habit (they are about 6 cm. across) they tend to the Jansen type.

Even grafted on *Trichocereus spachianus* they grow very slowly. They are splendid plants for amateurs as they take up so little space.

Comments on *Pyrrhocactus bulbocalyx*

. from G.Sharp

"My plant of *Pyrrhocactus bulbocalyx* was acquired on the 1965 Cactus Tour to Belgium and

Holland, from one of the amateur collectors whom we visited. The plant was on a grafting stock when I obtained it and it has remained that way in my collection.

"By 1971 it had grown to about 3" in diameter and in May of that year there were signs of buds appearing in the crown. However, on returning from this year's Cactus Tour I found that the buds had drawn back into the body. Rather surprisingly, they re-appeared early in July and later in the month grew to maturity and the flowers opened. The slender yellow petals had a brown midstripe on the outside, the throat being more of a brown rather than a red colour.

"The flowers were rather disappointing as they never opened fully, the petals remaining quite upright from the urn-like tube. The flowers opened over a rather sunny weekend when I was at home all the time and I kept popping down to the greenhouse to see if they were any further advanced in opening, but there was no change in the flower shape.

"No fruit was set when the flower withered".

(We now have slides in the slide library showing this plant in bud and flower - A.W.C.)

..... from H.Middleditch

"The slides show that the flowers on this species are very similar to those depicted in the illustration showing this plant in flower in Backeberg's *Die Cactaceae* Vol VI, Abb 3398.

"My own plant of this species has the typical stout spines curving to follow the body shape and overlapping those from adjacent areoles. I suppose I could describe the colour of the spines as pinkish - cream. Having a solitary small specimen of *Pyrrhocactus catamarcensis* with a much more markedly reddish colour to the spines, I would have considered it practicable to distinguish between the two species. However, on paying a visit to the collection of H.Ewald I found there three or four plants of each species which showed only a slight degree of difference in shade of green body colour and shade of reddish spine colour. It may be that these two species are less readily distinguishable than I had believed."

..... from J.D.Donald

"The slides are certainly of a plant which is frequently sold as *Pyrrhocactus bulbocalyx*. The question that really arises is - is *P.bulbocalyx* synonymous with *P.catamarcensis*? After having looked at many seedlings of both from wild seed and compared mature imported plants of all the acknowledged species of *Pyrrhocactus*, I have come to the conclusion that there are only two species in the Backeberg sense of the genus: *P.straussianus* and *P.umadeave*. They all have the characteristic pinched in flower as illustrated in the slides - the term "*bulbocalyx*" could be applied equally to them all.

"Like many of the South American genera, *Pyrrhocactus* shows a considerable natural variation within each species particularly as regards spine and body colour. Spines from pale yellow through reds or browns to blacks are frequently met, often in the same population, or more often as gradual changes throughout the whole distribution zone. Occasional isolated populations of one form or another also occur. Blue green glaucous bodies or wholly green bodies again vary throughout the entire distribution, from the Rio Colorado (Patagonia) to Potosi (Bolivia) over the whole eastern side of the Andes.

"The Chilean *Pyrrhocactus* of Backeberg i.e. *P.subianus*, is possibly *Nichelia* (*Neochilenia*) but it also could be an *Eriosyce* - it is certainly not a *Pyrrhocactus*.

"*Pyrrhocactus straussianus* (K.Sch.) Berg occurs throughout the whole range. Within this species-complex are numerous subspecies or varieties which correspond to the Backeberg separate species:-

<i>P. atrispinosus</i>	Mendoza)	
<i>P. melanacanthus</i>	San Juan)	
<i>P. vollianus</i>	Rio Colorado)	Black spined forms
F.R.9)	
<i>P. catamarcensis</i>	Catamarca)	
<i>P. sanjuanensis</i>	San Juan)	Black to brown spined forms
<i>P. setiflorus</i>	Mendoza)	

From Salta, in north-west Argentina, *P. dubius* comes in pale yellow to pale brown spined forms.

From Tupiza in Bolivia, *P. tupizensis* and other Kz plants come in black to brown spined forms and even pale yellow spined plants as well.

"Also in the *straussianus* species complex are *P. dubius* and *P. tupizensis*.

"*Pyrrhocactus umadeave* (Fric) Backbg is limited to a narrow range in habitat, in the Quebrada del Toro, Puente Tostil. It is very different in spination from *P. straussianus* - white to black forms exist. In *P. umadeave* the characteristic white radials and black centrals are all strongly upwards and inwards directed, whereas in the *P. straussianus* the spines are generally more openly and laterally displayed with only the centrals strongly upward curved.

"The plant *P. umadeave* v. *marayesensis* is puzzling but I believe it might belong to *P. straussianus* rather than *umadeave* from its type of spination. This variety has not been well characterised and import plants may have been wrongly called v. *marayesensis* to give me this impression. Lembcke's photograph of the plant in the *Kakteenlexikon*, though, suggests that all the spines are upward curved as in *umadeave*. Hence I have some doubts that the plants collected recently as v. *marayesensis* may in fact be Backeberg's *P. melanacanthus* which is almost certainly part of the *P. straussianus* complex.

"The only difference that I can see between *P. melanacanthus* and *P. atrispinosus* - both blue-bodied plants and neighbours (San Juan and Mendoza) - is that the spines of the latter are straighter (very much like F.R.9 in fact!)

"The recorded difference between *P. umadeave* v. *marayesensis* and *P. melanacanthus* is that the former is green bodied and certainly the v. *marayesensis* grows nearer to *umadeave* than the recorded habitat of *melanacanthus*, but there is little else to suggest a close affinity. Marayes is north of San Juan but south of the Quebrada del Toro in the same line of development of *P. straussianus* from the Rio Colorado through San Raphael to Mendoza to San Juan to Catamarca to Marayes to Tostil to Tupiza.

"*Pyrrhocactus dubius*, like its name, is also not entirely straightforward. The plants that are frequently sold as *P. dubius* are much less spiny than any other *Pyrrhocactus* and the flowers, though short tubed, are much less pinched-in than the other species, resembling *Horridocactus* more than *Pyrrhocactus*. Yet plants collected by Lembcke on the Famatina massif (U 2019) and tentatively identified by Backeberg as belonging to *P. dubius*, are quite different from the cultivated plants as sold with the same name. The spination is pale brown to dark brown and arranged like the *P. straussianus* group and with the typical *Pyrrhocactus* flower. Certainly the description given by Backeberg fits the collected plants and not those of horticultural origin. The question is, what are the latter?"

.... and further from H.Middleditch

"In my collection I have a plant of *P. dubius* which produces the short-tubed flower with numerous small, blunt pointed scales on the tube, which appears to be typical for *Pyrrhocactus*. However, the flower does open quite wide, the upper part of the petals opening out almost flat

given sufficient sunshine and warmth. This plant is grafted, but that alone would hardly account for the very open nature of the spination in comparison with, say, *P. catamarcensis*. This plant has set seed and some seedlings are now coming along on their own roots in another local collection, but it is early yet to make any comments and observations on them. Presumably this is the dubious *P. dubius*.

"Early this year I was able to obtain a small grafted plant of *Pyrrhocactus sanjuanensis*. This bears not the slightest resemblance to either *P. catamarcensis* or *P. bulbocalyx* at the moment: the straight black centrals terminate in a quite distinct hook, so setting the plant apart from all the other Neoporteriae which I possess."

... from R. Moreton

"I have a plant of *Pyrrhocactus catamarcensis* which must be quite old, having come to me from someone who gave up collecting, yet it only flowered for the first time in 1970, producing one flower. This year (1971) it has had about half a dozen. The flowers were almost identical with those of *P. bulbocalyx* which are to be seen in the *Kakteenlexikon*."

A CACTUS COLLECTING EXPEDITION IN SOUTH AMERICA by Harry Blossfeld

(From the Journal of the Cactus and Succulent Society of Great Britain for December 1935)

The beautiful flowers of the South American dwarf cacti, *Rebutia* and *Lobivia*, which during recent years have become familiar to an ever-increasingly large circle, and of the large-flowered *Echinopsis*, which fascinated me during my gardening apprenticeship by the indescribable colouring of their large and numerous blossoms, offered inducement enough from the horticultural and scientific point of view for the undertaking of an exploratory and collecting trip to their native home. From the horticultural point of view it was important to search for and introduce rare or new species in order to stimulate the interest of cactus lovers. From the scientific point of view it seemed desirable to obtain greater certainty on the geographical distribution, the systematic delimitation of species, the occurrence of local variations and to collect data so as to verify the correctness of the classification of those species already described. The latter task is especially important, having regard to the chaotic condition of the nomenclature of the species discovered in recent years, where different opinions, with more or less scientific grounding, contend for recognition.

The final incentive to the realisation of the scheme for such a journey was given by the well-known Argentinian cactus collector, Herr Marsoner, who was the first to send many of the newly-discovered species to Europe and who himself volunteered to make the journey jointly with me. So I willingly took leave of absence from botanical studies to prepare for and carry through this trip.

From my horticultural experience I have gained a comprehensive idea of the most valuable cacti from the gardening point of view and of their characteristics. From long study of the classification of cacti and their areas of distribution I have the means of bringing back home with me from this trip, scientific observations of value. For valuable additions to my list of localities, arranged geographically and systematically, I have to thank the friendly collaboration of almost all the botanists interested in botany, whilst from explorers who know the country, I have received innumerable suggestions, directions, advice and introductions. Besides this, owing to the personal and business contacts of my father in South America, I have received counsel, support and help in many places.

The localities of various species were marked on a large map of South America, the result being a route of about 20,000 Km as the crow flies, if the journey was to cover Argentina, Bolivia, Peru, Ecuador, Chile, Uruguay, Paraguay and Brazil. In view of the magnitude of this scheme I had to restrict the route to the chief areas of distribution. But even this plan had to be changed

several times during the journey, when we came by chance on new localities which led us far from the pre-arranged route, if we were to explore them thoroughly.

The easily accessible cactus regions along the main railway lines had been "worked out" by other cactus collectors. So I proposed to make my journey with a small two-ton lorry, which certainly was very tiresome and time-wasting, but in spite of this, promised better results, for only thus could we thoroughly investigate the remotest regions not yet explored, and there find valuable new plants and rarities. I therefore bought, after a thorough try-out, a four cylinder Ford truck, with closed body, so as to be able to protect our plants and luggage from rain and dust. A Ford was chosen because one can easily get spare parts for this type throughout South America, even in remote places, because this type of motor is known to meet the demands of bad roads and because the motor has a reserve of power by means of which we hope to be able to get over the Andes even. Before our departure the lorry was fitted with special contrivances for our convenience and also with thick balloon tyres which travel better on sandy unmade roads, and do not sink in so deeply. Tools and a good supply of spare parts were procured, which would all prove useful, for our breakneck journeyings up hill and down dale would cause much damage. On every trip something was smashed, if it was only the mudguard, the running board, the springs, reflectors or the driving screen.

Not having much money at our disposal we had to camp in the open wherever night overtook us. This primitive method of travelling has the advantage that one can stop at the place where the species occur and be in position to work again in the cool morning hours of the following day. For the cacti mostly grow far from houses and settlements, on bare mountain tops, and so one can save such time by this form of travel.

We pushed on eagerly all day; in spite of this one advances but slowly, by ways which defy description. We filled the water tank at streams and rivers, halted at likely-looking places - we gradually developed a fine instinct for cactus localities - unpacked machetes, rucksacks, ice-axes, photographic apparatus and Brownings and then hunted over the ground on foot. The mountains were usually surrounded by a dense belt of thorny scrub, through which one had laboriously to work one's way. Here face and hands were badly treated, and the stoutest clothing, windjackets, rucksacks and even my so-called "thornproof" shirts were torn to shreds.

We soon learned to know from experience all the other pleasures, large and small, of cactus collecting. For instance, when there was a wasps nest in a cactus which one had got to collect, or ants in the food stores; then again, enormous stones or trees had to be removed from the road, a broken bridge necessitated the fording of a river, where the lorry has almost learnt to swim, or a breakdown in a remote district. When collecting in the neighbourhood of Trancas, north of Tucuman, we were attacked by a microscopic kind of mite which lives in shrubs and undergrowth; this penetrated our skins and set up a violent irritation. It could not be removed by any means, but appeared to die of cold in the icy mountain nights, high up in the north. Another time we found a snake which we wished to send to the Zoological Garden at Buenos Aires. We shut it in a box and when Herr Marsoner one morning wanted to see how it was getting on, it struck with its fangs and bit his inquisitive outstretched nose so that blood spurted! Luckily it was not poisonous!

When we appeared unexpectedly in a large town in our well-torn travelling kit, with the lorry piled up with luggage, we were invited by a police sergeant in a most friendly way to go to the police station with our lorry. Our consciences were not entirely clear for the hunting guns were in the wagon and we had no permit to hunt. On the driver's seat lay my large Browning, another hung in the haversack on the side. We went rather anxiously, with the policeman as a guide on the running board. The chauffeur trod on the gas, in the quiet hope that the policeman would lose his hold at a sharp turn in the road further on, which we took at 60 Km per hour. Unfortunately, however, we had underestimated his muscles and his persistence. We had to stop at the police station, our pockets were emptied, and, smiling, we showed our 1,001 permits. The chief station was telephoned and we had to go up to this station. On the way there, the arms were so thoroughly hidden by the presence of mind of the chauffeur, that they were not discovered. Then renewed examination and a renewed presentation of our permits. Then each of us was

decorated with a large number and we were, as was soon obvious, photographed for the criminals' register. They took three impressions of the ten fingers of each of us and immortalised them with the photographs in the criminals' gallery. After an unwilling halt of five hours we were released with a friendly laugh and even my pocket-knife was returned to me. In this town another European cactus-collector was similarly treated. The involuntary halt at the police station had upset our plans for the day so that we could not reach the next destination till darkness had fallen, and had to camp out in the bitterly cold night. We tried however, to swear ourselves warm at least, which made it easier to sleep.

When at noon, we returned to the lorry, dead tired and sweating from our labours, the collected plants were packed up, the tent cover was spread over the cases and we journeyed on to any sheltered dry place, free from ants and snakes, where we could find a night's lodging. As soon as the sun sinks below the horizon it is night immediately, with no twilight. If we were late looking for a camping site, we had to hunt around with lanterns for firewood, if any was available. Then we made a fire, cooked macaroni or rice with tomatoes, meat paste, or with game we had caught, or there was only dry bread or ship's biscuit with Yerba. It is hard to get used to this tea, so much beloved in South America, which is prepared from the leaves of *Ilex paraguayensis*, and one first gets the real taste after one has drunk a couple of litres of this herb tea. It is very healthy and promotes long life. In this hope I drank it resignedly.

After meals the crockery was washed, if there was enough water available, the chauffeur attended to the vehicle, Herr Marsoner packed in the luggage, I wrote up my diary and saw to the most important correspondence and then we crept into our sleeping bags and under the covers, for the large tent cover, folded many times, served as a mattress. With the top layer of the tent we kept ourselves dry; the Brownings lay ready to hand near us, close to the fire. In spite of this the great cold woke us as a rule before dawn. For in winter here towards morning the temperature on the lowlands falls below freezing point and everything is covered with frost. At greater heights the night temperature may be 15°C below zero. Then the fire is set going again, the inevitable Yerba mate tea brewed; with this we have dry bread, bread and honey, or 'marmalade dulce'. This is a horribly sweet marmalade made of all possible fruits, even *Opuntia* fruits and potatoes can be recognised in it. Then we pack up with all speed, load up, fasten the cover firmly over the truck and set off to do as much as possible before the grilling heat of mid-day becomes too enervating. Washing is a luxury as it were, for it can only be managed when the camp is set near running water.

Later in the Puna (as the high plateaux of the Cordilleras at 3,700 - 4,600 m above sea level are called) shaving was discontinued, for in the rarified air of these notorious plateaux the skin becomes so dry that it cracks and bleeds. Here the well-known Puna disease, the Soroche, is prevalent. It is caused by the reduced atmospheric pressure and low oxygen content on the body and reacts especially on the brain, the circulation and the breathing. One gets giddy, with a feeling of muscular weakness and inability to carry out voluntary movement with precision; inability to see clearly, severe headache, breathlessness and bleeding from the mucous membranes of the lungs may occur. On such an expedition into the Puna my travelling companion had to turn back halfway because of bleeding.

Even eating was hard work for us. When standing one cannot swallow a mouthful, one must either sit or lie. We had to drag along several plants weighing about 15 Kg which seemed to us so terribly heavy, like a whole rocky pinnacle. Another time I wanted to search a certain district, whilst my companion went on with the car. This little digression was made on mules, and I hoped to get down again by evening, but was delayed, and had to spend an icy night in a bug-ridden native hut, covered only with old newspapers. Up above there our *Polverin*, the native name for the skin mite, is killed by frost, and was almost forgotten when letters from home arrived with suggestions for remedies.

Now I will report on the most important of the areas travelled up to now and on the cacti collected or discovered and erect a small memorial to our loyal Ford for the brilliant demonstration of its capacity for work. For high up in Jujuy, where the people have a better understanding of the difficulties of our trips than a European unfamiliar with the conditions in South America, our Ford

as well as ourselves were regarded as wonders. Here no one would have believed a word of our tales had I not, as the surest and best proof that we really had been in all the districts that we described, been able to produce my photographs with the complete record in pictures of our journeying up to then. It appears that this photograph album is the best letter of introduction, and one which opens for us all doors amongst the very hospitable Argentinians.

After we had struggled for weeks in exasperation over the release of my equipment by the customs and acquired an idea of the meaning of the phrase "manana" (tomorrow), after we had finally even teased the customs officer on the unbelievable slowness of his mind, we went on to the Province of Cordoba. Here we found the beautiful *Lobivia violacea*, *Echinopsis aurea*, *Echinocactus lafaldensis*, *kurtzianus* and *multiflorus*. Some of these plants I sent to my father at Potsdam, which he, as an experiment, sent on to Australia. News has come from the consignee that these plants, although they had made a double journey across the world, were received in Australia in perfect condition.

We wanted to make a digression from here for a few days only towards the south, into the mountain chains of the Province of San Luis. But we struck such an incredibly bad road that we could only proceed very slowly. Once we stuck in the mud completely, and another time the rise was so steep that even our Ford jibbed and we had to unload, proceed empty, and carry up the whole of the baggage, including several hundred kilo of cactus plants, and reload up above. From Cordoba we sent in advance to Jujuy all the plants so far collected, and all the luggage we could do without. We had not realised that it would take us three weeks to cover the awful road through San Luis. In spite of everything it was worth all the trouble. We found the white-haired *Lobivia* I had expected, to which I gave the number 19. It is probably new, but certainly the most beautiful of the *Lobivias*. We also found a dainty little dwarf *Opuntia* and the rare *Lobivia spiniflora*, whose petals terminate in fine spiny tips.

Along the only road leading westwards, which was in an appalling condition, we then went into the Province of La Rioja. Taken all in all it is an unutterably barren and desolate region. Here we found a terrible landscape, completely dried up, with only a few ruined houses of long forgotten human settlements. Here also we were very short of water. On the plains the vegetation was miserable. Stretches were overgrown with *Opuntia diademata*, which is here almost spineless, and with *Opuntia strobiliformis*. On a small Sierra we found *Echinocactus saglionis* and the peculiar *Echinopsis* No.20.

Our next aim was the 6,000 m high mountain, Famatima, where we hoped to find the beautiful *Lobivia famatimensis*. But at Vichigasta, a wretched village at the foot of this snow-covered mountain, our axle broke, and we had to make an unwilling stay of three weeks. Owing to the miserable road and the overloading of the lorry, the differential drive was also damaged. We employed this delay to change the lorry, previously of the closed type, into an open one, by sawing off the upper part, which made possible a considerable increase in the effective load.

We tied our large tent cover over the luggage space as closely as possible, but, in spite of this, everything packed underneath was covered thick with dust each evening. For our car, except when it was going straight over a stony slope, was always in a high cloud of dust, since the road usually consisted of a foot-deep, fine dust. During the involuntary halt we sought for *Lobivia famatimensis*, but vainly, for we found only three specimens. But we did find a whole series of unknown cacti in the high mountain regions.

When the repairs were finished, we travelled in a great semi-circle, first northwards, then eastwards, then southwards to Catamarca. There we found *Lobivia andalgalensis*, which we were the first to export; this is of slender, columnar habit with wonderful spines. We also found *Echinopsis aurea*, *Cereus baumani*, *C.coerulescens*, which had always been collected and exported previously in error as *C.azureus*, as well as *Cereus coryne* and again *Echinocactus saglionis*.

Comments from R.W.Field, Australia.

"Yes, the plants that Harry Blossfeld sent to his father - Robert Blossfeld - in Germany, were repacked on arrival and redirected to me in Australia. With the exception of *Gymnocalycium kurtzianum*, all the plants - or should I say offsets from them - are still here; probably some of the original plant bodies are here too. As the plants grew - for instance *Lobivia aurea* - they got top heavy and unsightly on the lower portion, so the tops would be taken off and rooted.

"It does not seem long since the plants landed here and my wife and I - we were not long married at that time - were greatly excited as we unpacked the boxes and were amazed to find the plants had travelled so well - 100%. I had a share in the Blossfeld expedition - I think it was £100 sterling, a lot of money in those days - however we got a wonderful lot of plants and with the exception of one species are still in the garden at this date.

"I was not a member of the G.B. Society at that time and have not seen the article by Blossfeld describing his collecting trip, before now".

..... from H.Middleditch

"The above article by Blossfeld gives an account of a collecting trip within the region described in Chileans No. 19 pp 191-195. There is an illustration with the original article which shows the collectors and their vehicle standing under a tree which must be thirty feet high and with an even wider spread of its branches, a photograph evidently taken in the Sierra de San Luis. Regrettably there is not the slightest indication whether this is intended to depict a typical scene, or whether it is more or less the only tree of this size for miles around. It certainly gives the impression of being a rather taller tree than one would have expected from the very sparse references available in literature to the local vegetation thereabouts.

"It is most enlightening to see the outspoken comment that 'from the horticultural point of view it was important to introduce rare or new species to stimulate the interest of cactus lovers'. Might one venture a thought that the same idea could perhaps have motivated some more recent collectors and that perhaps some of the newer species names may have been generated to titivate the market and maintain dealer's turnover, rather than from a strict botanical outlook on the collected plants and their degree of similarity to or variation from existing species?

"The article contains references to *Lobivia violacea* and *L.spiniflora*, both of which will now be found as *Acanthocalycium*; likewise *Echinocactus lafaldensis*, *kurtzianus*, *multiflorus* and *saglioni* will all nowadays be found under *Gymnocalycium*; whilst *Cereus coryne* will now be found as *Stetsonia coryne*.

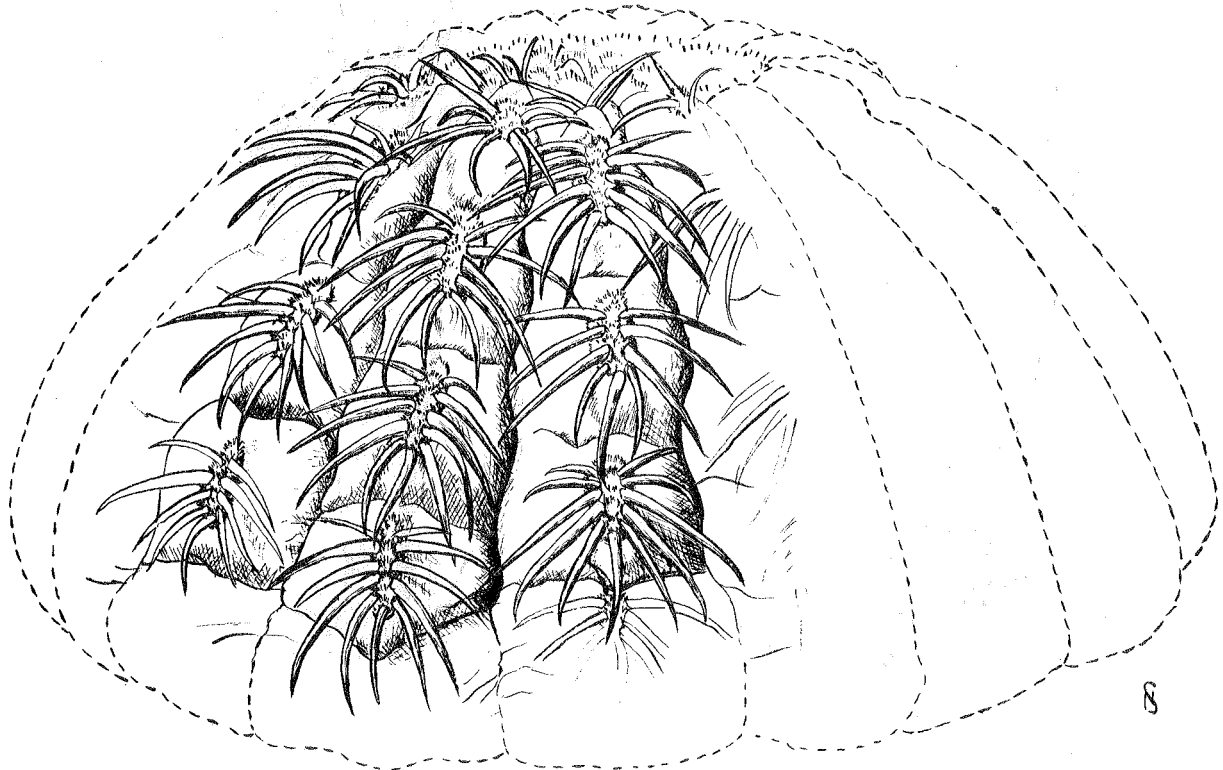
GYMNOCALYCIUM of the GROUP MICROSEMINEAE FRIC - 3 by Dr Bohumil Schutz

(Translated by K Wood-Allun from Friciana Nr. 16/ 1963)

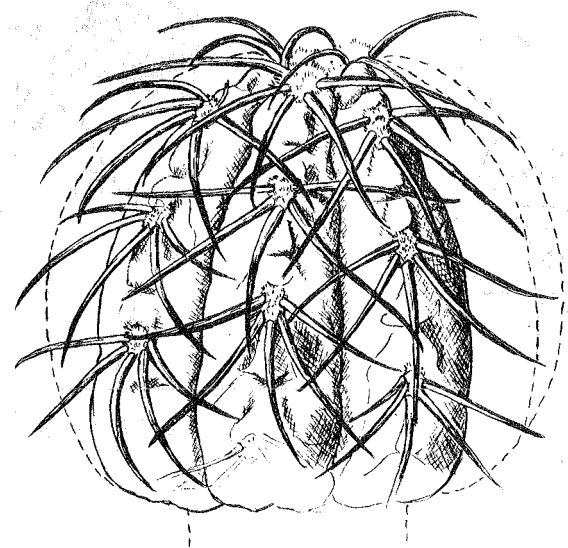
Section Loricata

G.spegazzinii. This plant is well known in this country and very common in collections.

Dr.Spegazzini described it in 1905 as *Echinocactus loricatus*. He discovered it near La Vina in Salta province. He gives the body as 6 cm tall and 14 cm in diameter. The crown is 3 cm across and slightly depressed and covered with grey felt. Later on Fric was collecting in Salta and discovered a similar plant which he named *horizontalonum*. Unlike Spegazzini, Fric brought plants and seed back to Europe. *Horizontalonum* can occasionally be found in collections, grown from Fric's imported seed. These are spherical plants with the characteristic felty crown. They do not flower. Pazout has named them *G.spegazzinii* var. *horizontalonum*. Backeberg discovered similar plants near Cachi. This form from the high mountain regions grows much larger, has a dark green body colour, longer spines, and flowers easily. There are many of them in this country



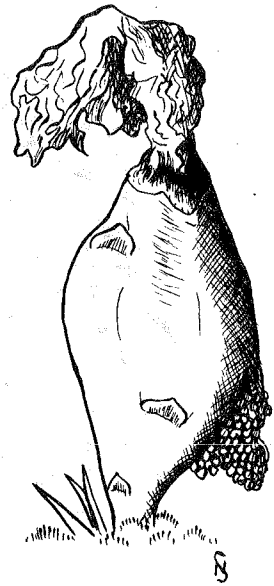
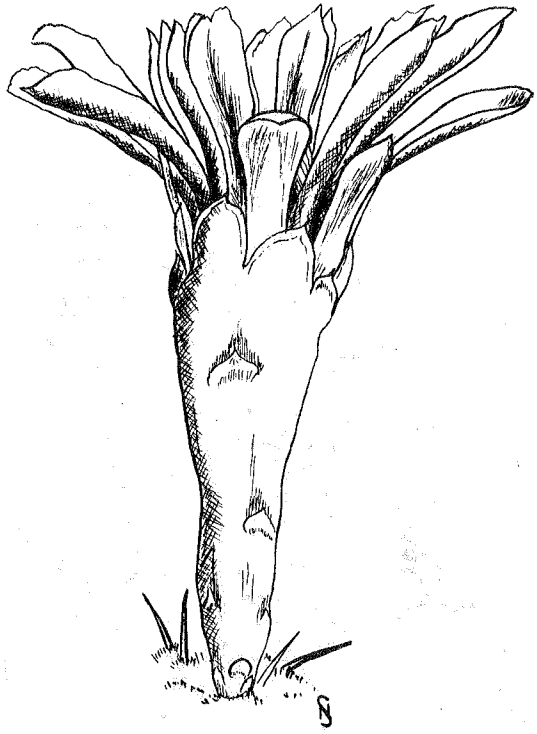
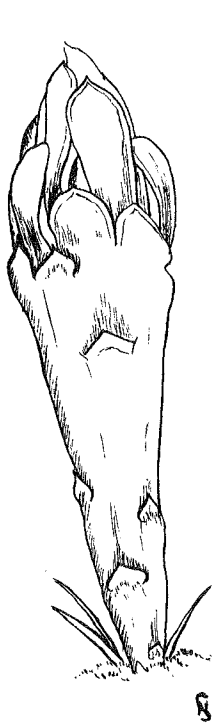
Imported plant
Collection - W. Withers.



Grafted Seedling.

Collection
H. Middleditch.

GYMNOCALYCIUM SPEGAZZINII.
Showing diversity of spine habit.



GYMNOCALYCIUM. SPEGAZZINII
Flower & Fruit shown full size.

under Backeberg's *G. spagazzinii* var. *cachense*, although later he altered this to var. *major*. Seeds of this beautiful plant were sent three years ago to Gottwaldor.

The exact place of discovery is not known but it appears that they originate from a different habitat. The spines on the seedlings vary in colour from white to dark brown. I have to thank G. Frank of the G.O.K. for the interesting information that Herr Rausch, who is in Argentina on a collecting expedition at the present time, has found at one spot mature plants of *G. spagazzinii* with three, five, and even seven, nine, or eleven spines. Spine colour also varies from whitish yellow to rust red to black, and length of spine from 1.5 to 4.5 cm, sometimes adpressed, sometimes protruding and curved. Flowers also vary in colour. The collector observed white, pink to brownish and, very occasionally, green flowers.

G. cardenasianum Ritter. This was one of Ritter's most significant discoveries. He found a *Gymnocalycium* in southern Bolivia which was similar to *G. spagazzinii* but which had a light coloured body and long light coloured spines. The seedlings are very beautiful and even in age the plant loses none of its beauty. The spines are sometimes darker and curved in different ways. A valid description has not yet been published although the plant is known from pictures in catalogues and also from plants in our collections.

The general survey of the *Gymnocalycium* seed group *Microsemineae* appeared in 'The Chileans' No. 16 pp 39-44. An illustrated review of the different types of seed found within the genus *Gymnocalycium* appeared in 'The Chileans' No. 12 p. 95 - H.M.

DIFFICULTY IN SPECIES DIAGNOSIS IN VARIABLE FORMS - ILLUSTRATED BY IMPORTED PLANTS OF *GYMNOCALYCIUM SPEGAZZINII* by G. Frank

(Translated by E.W. Bentley from K.u.a.S. 15.6. 1964)

The description of a species should embrace all the important characteristics of a species, so as to ensure that from then onwards plants can be identified clearly and definitively. The diagnosis depends on a knowledge of an existing or rather non-existent - variability on the part of a type plant (holotype), which then should be deposited in a recognised permanent collection or a herbarium. In very distinctive, non-variable species a detailed listing of all morphological characters of a representative individual can be effected. In species that are, however, still in transition and where strong form-development tendencies prevail, a clear species diagnosis in the usual manner is quite impossible. This is not because a type species has not yet been clearly produced. Here now lies the big danger, that through an exact description based on a single individual, other extant extreme forms are shut out, which leads to species-splitting and finally name chaos results. We find this already in the extremely polymorphic spherical forms of Chile and Argentina.

I can illustrate this from a series of forms of *Gymnocalycium spagazzinii*. All the plants pictured here were found by our members Herr Walter Rausch of Vienna in the course of his last collecting trip through Argentina and Bolivia. *G. spagazzinii* occurs in the near and further vicinity of the town of Salta and can be considered as very widespread. Herr Rausch collected it in the north near Cachi and also in the isolated location of Amblayo situated some 200 Km to the south. In his view all the habitats visited by him exhibited a similar great variability in this widespread species.

In earlier times when frequently no close contact and exchange of views took place with collectors in the countries of origin a buyer of a large importation into Europe has in good faith erected definitely more species or at least varieties from such a form-rich species. And then precise habitat observation and the subsequent view of a serious collector who is not interested in the production of species names shows, as in the case quoted here, that often an exceptionally

large number of forms stem from one defined locality.

It is a case then here and at other times of a very variable species of which it would be completely misleading to speak of true varieties. The species diagnosis must now be adjusted to the actual range of forms in habitat. From the observations in habitat and the type examples collected by Herr Rausch and Herr Fechner a species diagnosis for G. spegazzinii should read somewhat as follows:-

"Body depressed flat-spherical to pear-shaped or short cylindrical, up to 30 cm diameter, with a flat or even sunken crown that is more or less strongly wool-felted. Body colour light grey-green to dark leaf-green or even brownish. Ribs 8-15 either broad and very flat, with quite shallow furrows, or deeper furrowed and somewhat humped. Only outer spines, dirty white, greyish-yellow, horn coloured, reddish brown to almost black, flexible to very robust and strong, either all lying against the body or bent against the body backwards and downwards, sometimes however upright and twisted. Spine length very variable, sometimes scarcely over 1 cm long and then very robust and pressed against the body, alternatively on the average 3-4 cm reaching a maximum of 6 cm long. Spine number 3,5,7 or 9 per areole, mostly 5 or 7. Flowers short and sturdy, about 6 cm long, mostly pinkish brown or light pink, occasionally white to greenish-yellow."

The variety G. spegazzinii major Bckbg. and the nomen nudum G. horizontalonium Fric clearly fall then within the wide range of this form-rich species without attracting to themselves as much as even a variety ranking.

In this connection may I in conclusion mention the following. If today in our collections we possess a number of species that each correspond to one distinct type, are fairly pure genetically and yet, according to our present knowledge of the situation in habitat, must have originated from a single very variable form-complex then must this be for the following reason. We know that, in good faith, the extreme forms from earlier large importations here into Europe of variable species were described as separate species. Then these plant types with their given names attached by the authors of that time and subsequently by others were increased vegetatively and thus remained for generations practically unchanged in appearance. Or instead, these species have been increased sexually, whereby naturally, in each case, only individuals of similar appearance were used for seed production. The result of this was that in the case of many plant generations a pure line resulted, because in the interests of producing more seed only the forms conforming to the description of the 'species' were bred from. So, originally extreme types of a strongly varying 'form swarm' were in the course of time unconsciously bred pure and are held in our collections today as good species. However, in habitat, one can see growing a whole series of such "European species" with all intermediate and transitional forms right next to each other.

Comments on G. spegazzinii by Frank

..... from H. Middleditch.

"The accompanying illustrations of two plants of Gymnocalycium spegazzinii bear out the observations made by Frank on the diversity of spine habit. One explanation for the difference between these two particular plants could be that there were originally two radial spines per side to each areole and that subsequent axillary growth (see 'What is a cephalium', this issue) produced the additional spines. Had this been so, one would have expected to see areoles with an increasing number of spines from the top of the body downwards - and as can be seen from the illustration, this is not the case. The new areoles in the crown do not produce eleven spines all together, but start with one or two spines and the remainder would seem to appear over the course of the season, in a similar manner to other Gymnocalycium.

"The flowers are described as "short and sturdy" by Frank, which seems a little inappropriate for a flower of this size. Frank himself gives a length of 60 mm for the flowers, whilst the illustration accompanying the article by Hans Till on G. bayrianum gave the length of the flowers on G. spegazzinii as 66 mm; I would put the flower seen on the imported plant shown on the accompanying

sketch and also depicted here at about this size. For a *Gymnocalycium* I would not have been inclined to call a flower nearly three inches high, "short".

..... from E.W.Putnam

"The first paragraph of Mr Frank's article ought to be engraved on plaques to hang above the desk of every serious student of the Cactaceae, or indeed any other plant family. For a very long time successive botanists and amateur taxonomists have been falling into the trap created by an apparently precise but actually fallacious formalistic procedure for the naming of taxa. In ignorance of, or with careless neglect of, the nature of natural diversity in wild plant populations, many describers of "new species" or even "new genera" have placed on record closely detailed descriptions of their chosen type plants. Where these descriptions have been in accordance with the formal rules of taxonomy, they have become, so to speak, fossilised in the records. They are then straitjackets or precisely engineered moulds into which a plant must fit if it is to be accepted as a genuine specimen of the particular species. As a consequence, plants failing to conform exactly to the hallowed original description become fodder for those wishing to erect new species.

"The genus *Gymnocalycium* has suffered as much as any cactus genus from unjustifiably narrow species descriptions with consequent excessive splitting of the wild plants into "species". One can look upon the work of Schutz, Buxbaum and others, which has brought us a basically sound division of *Gymnocalycium* by seed types, and agree that here is a natural division of the plants. But looking within the seed groups one is confronted very frequently with lists of "species" which are proving more and more difficult to separate from one another. Gerhart Frank has looked with a critical eye at a number of these "species", notably the group of yellow-flowered *Gymnocalyciums* from Uruguay, as well as the *G. spegazzini* "complex". J.D.Donald is also engaged on studies of this kind which will undoubtedly lead to suggestions for the submergence of certain "species" into synonymity with others. Similar work is in progress among other cactus genera; David Hunt has recently published the results of his labours among the *Mammillarias*, where he has brought a measure of clarity and commonsense still sadly lacking from some of the work that appears in print today.

"*Gymnocalycium spegazzini* is not a species I can write about with any authority. I have a number of plants and some of several clearly closely-related species, but all are young seed-raised specimens which are only now approaching flowering size. Nevertheless, as plants I can commend them to growers: they are good, strongly-spined plants of robust and handsome appearance. While I would not dream of embarking upon taxonomic adventures myself, I notice that as more and more plants reach us from collectors like Rausch, Lau, Fehser and others, so the boundaries between many of the so-called species become blurred by "intermediate forms". Thus I welcome the work of Frank, Donald and all like-minded students in bringing the light of reason to bear upon the tangled jungle of cactus nomenclature."

GYMNOCALYCIUM BAYRIANUM sp.nov. A fine *Gymnocalycium* from North Argentina
by Hans Till

(Translated from K.u.a.S. 18.12: 1967 by E.W.Bentley).

When in the autumn of 1964 some Austrian cactus friends visited the well-known cactus importing firm of K.H.Uhlig at Rommelhausen, an imported cargo had been received from North Argentina a short time beforehand. The visitors, of whom I was one, came across, amongst other things, a staging with some *Gymnocalycium* imports already potted up, which differed so much in form from all known *Gymnocalycium* species that it was certain that something quite new was involved. For this reason all the specimens (there were about 20) except for a few that Herr Uhlig wanted for himself, were bought. From these the five biggest and finest were selected for the 'Type and Protected collection of succulent plants' of the Linz Botanical Gardens; they were

entered there as Nos. 446-450. I obtained four plants for my collection, the rest a third collector bought.

Of the origin of the plants, which bore the field label 'Gymno spec. from Cerro Medina', Herr Uhlig informed us that the plants had been found in the mountains near Medina by the collector Schickendantz who lived in Tucuman and had been exported by him.

As the plants then flowered, set seed and the offspring thus obtained could be observed, it was rendered certain that the above plants were a valid new species. I give the description of the imported plants with their completely uniform descendants as follows:

Gymnocalycium bayrianum sp nov. Radix subrapiformis. Corpus depresso-semiglobosum, ca. 60-120 mm dia. vertice paulum depresso, glauco-viride. Costae 6-10, postea plures, rectae, basi ca. 30 mm latae et applanatae, vertice elatae, submucronatae, subtiliter transverse crenatae. Areolae ca. 20 mm inter se distantes, rotundae, juveniles flavo-villoso-tomentosae, postea canescentes et evanescentes. Aculei marginales 5, ca. 25-30 mm longi, rotundi, submucronati, corpus versus curvati, pungentes; aculei centrales 0 (-1) 35-45 mm longus. Flores e vertice orientes, prompte efflorescentes, 60 mm longi, 40 mm diam., cremeosericei. Receptaculum breve, 16 mm longum et 10 mm diam., glaucum, dense squamis lilacino-roseis, postremo elongatis et receptaculo concoloribus obtectum. Phylla perigonii exteriora 22 mm longa, 8 mm lata, cremea, linea median a micante ornata. Phylla perigonii interiora basi rubro-tincta. Antherae flavae, filamentis albidis, tubum longe superantes. Stylus stigmatibus 11, flavovirens. Camera nectarifera angusta, basi vix dilatata. Fructus ovoideus, submucronatus, 8 mm longus 4.5 mm latus, glaucus, squamis roseo-lilacinis obtectus. Semina parva, oblonga, curvata, hilo ovali, subcurvato. Testa ferruginea, verrucosa, scrobiculata. Microsemineae (sensu Fric.).

Patria: Argentina septentrionalis, Prov. Tucuman, prope Medina in Monte Medina, 1,000 - 1,500 m. s.m.

Root - short tap root.

Body - flattened hemispherical, blue-green to green, the examples to hand ca. 60 to 120 average 90 mm diameter. Crown slightly depressed, mostly free from spines.

Ribs - 6 to 10, later more ribs pushing in, straight, very broad at the base (ca. 30 mm) and very flat, near the crown somewhat raised and weakly rectangular, shallow furrows above the areoles.

Areoles - about 20 mm apart, new growth with tufted yellowish felt, later greying and disappearing.

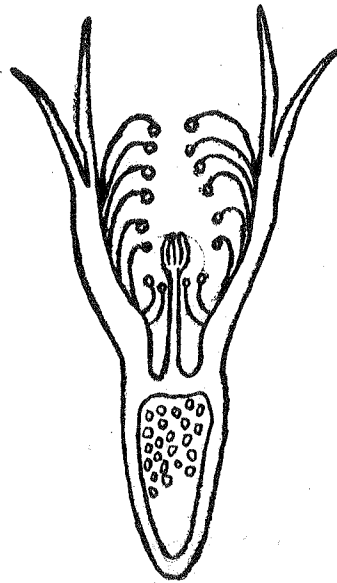
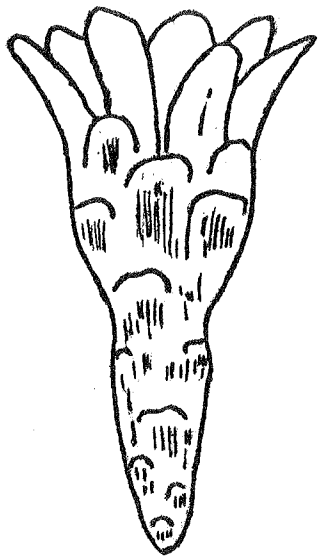
Spination - 5 radial spines ca. 25 - 30 mm long, mostly round but sometimes with corners, curving over the body, stiff, the two uppermost curving upwards, the two middle curving downwards and the lowermost pointing straight down. In new growth light brown sporadically with darker tips, later going grey, sometimes one middle spine 35-45 mm long.

Flowers in the vicinity of the crown from the uppermost areoles, funnel-shaped, opening freely, quite long, (average of four examples) 62 mm long, 40 mm wide, cream-white with silky sheen.

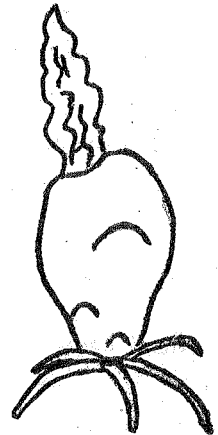
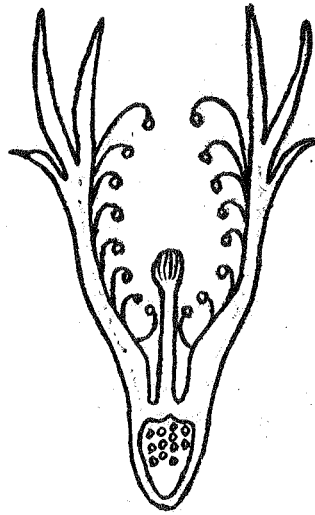
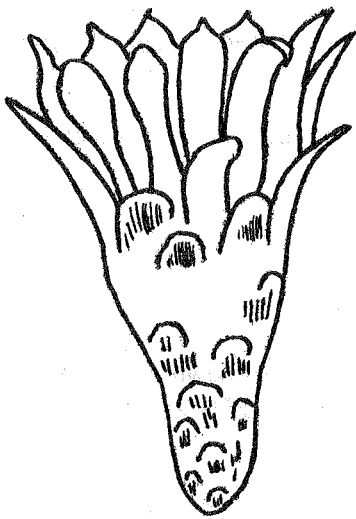
Receptacle short, 16 mm long, 10 mm diameter grey-green, thickly covered with hemispherical lilac rose scales blending into red-brown-green later on turning the same colour as the receptacle, still with a lilac-rose margin.

Outer perianth leaves spatulate ca. 22 mm long, 8 mm broad with a broad metallic shining middle stripe. Inner perianth leaves broad lanceolate ca. 27 mm long 6 mm wide, cream-white with silky sheen and reddish at the base.

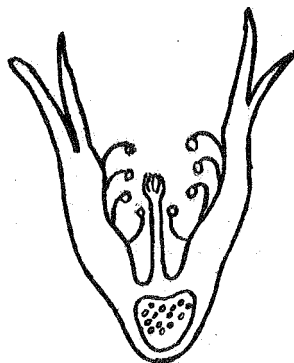
Filaments - very fine long white, the lowest row lying up against the pistil and so enclosing the nectar gland, the other rows one above the other arranged against the wall of the perianth tube, over-reaching the pistil. Anthers light yellow.



GYMNOCALYCIUM SPEGAZZINII



GYMNOCALYCIUM BAYRIANUM.



K.u.a.S.
18.12:1967.

GYMNOCALYCIUM CARDENASIANUM.

Flowers & Fruit
app. Full size.

Pistil reaching up half the length of the tube, 11 mm, 16 mm long with the stigma, 1.6 mm diameter, greenish yellow with 11 lobes.

Nectary deep and narrow, scarcely dilated at the base.

Ovary acorn shaped, 8 mm long, 4.5 mm diameter, white, full of ramified seed strings.

Fruit ovoid, somewhat rectangular, grey-green, blue frosted, ca. 25 mm long, 16 mm diameter, with few broad light lilac rose scales, opening lengthwise.

Seeds - small, longish, slightly curved, ca. 0.8 - 1.0 mm diameter. Testa matt red-brown, with fine warts, pitted between. Hilum oval, slightly curved, scarcely depressed, without marginal thickening, micropyle somewhat raised. Seed group Microsemineae (after Fric).

Origin - Province of Tucuman near Medina, on the tops of the mountain range of the same name at about 1,000 - 1,500 meters.

Named in honour of Director Alfred Bayr, the President of the Gessellschaft Osterreichischer Kakteenfreunde and a well-known plant expert.

Gymnocalycium bayrianum undoubtedly belongs, as does *G. cardenasianum*, to the relationship-group, but not to the form-group, of the very variable *G. spegazzinii*. It differs from this through the lighter body colour, fewer, flat and broader ribs, shorter freely opening flowers, light yellow anthers, fruit turning pear shaped and longish seeds. The seedlings at first bluish-pink later become light green and soon show strong armament; it is not possible to confuse them with another species.

The type plants are in the "Type and Protected collection" of the Botanic Garden of the Town of Linz and are listed under Nos. 446 to 450.

(We have been unable, to date, to locate the Cerro Medina: anyone able to offer a map reference would provide much valued information - H.M.)

GYMNOCALYCIUM CARDENASIANUM FLOWERS by G.J.Swales

The plant drawn on the front cover was collected in the region of the town of Carrizal in Southern Bolivia, about 60 Km from the Argentine border (at 65° 16' West 21° 27' South) at a height of 2,500 m.

Backeberg in his Lexikon states that the origin of *G. cardenasianum* is "Bolivia, Province Mendez, Department Tarija, Carrizal". However, according to my map, Carrizal is in the Province of Aviles, Mendez Province being further north. To make matters worse, the Lau 929 *G. cardenasianum* is catalogued as from "Carrizal, Sud Cinti" but Sud Cinti is a Province north of Mendez and in the Department of Chuquisaca. Although these localities collectively represent a fairly compact area, I would be pleased to hear from anyone who feels that they have an answer to these apparent discrepancies.

When I received the plant in March 1970, it was very dehydrated and flattened almost into a disc. Even in this state it was obviously a magnificent specimen and already showing signs of wanting to root. Having given it a good wash in a bowl of moderately warm water, I left it to soak for an hour or so as is my usual practice with imported plants. It was then quickly dried (over the boiler in the kitchen), put into my usual peat-and-grit mixture and stood on the hood of the fish tank in the living room. I did not record how long it was there before it rooted but it was quite a short time. So, encouraged by the signs of roots coming out of the drainage holes of the pot, I put it straight into the collection and from then on it received no special treatment.

It soon filled out into its proper shape, which is reminiscent of a pumpkin. Can I hear cries of "too much water!"? I can confidently say "proper shape" because as the grooves between the ribs opened up, soil from (presumably) its native habitat which had survived my quite thorough preliminary

washing, was exposed and could be blown free, thus confirming its return to normality.

Towards the end of summer 1970 it produced two flowers and in the early part of summer 1971 it produced about half a dozen more. In both instances, the buds originated quite close to the growing point of the plant and opened more or less together. (Artist's licence allows buds and flowers and fruit to appear together on the illustration). The flowers themselves were relatively short tubed but emerged well clear of the spines when mature. In full sun they opened wide, the outermost petals being approximately horizontal. The colour was almost pure white with just a suggestion of pink but shading towards the centre into a conspicuous wine-red throat. One of the 1970 flowers was hand pollinated with pollen from the *G. spegazzinii* ex W. Withers (also illustrated in these pages) which was on loan from Harry Middleditch at the time for drawing, and a reciprocal cross was also made. Both plants set seed in abundance which matured fully before winter set in. *G. cardenasianum* produced a short fat globular fruit, which split vertically when still pale greenish and somewhat succulent, exuding a mass of typical small brown seeds which remained attached to the fruit and to each other by means of the sticky remains of the funicles or seed-stalks. The flowers of 1971 set no seed at all under "natural" greenhouse conditions even though surrounded by a good selection of other flowering *Gymnocalycium* species.

On comparison with Backeberg's description, two discrepancies are obvious - lack of centrals in my plant and different flower colours. In the few photographs which I have available, I cannot convince myself that centrals are present in any, but I admit that photographic interpretation can be very deceptive.

Compared with other *Gymnocalyciums* in my collection, I find that *G. cardenasianum* is one of the slow growers and - at least under my greenhouse conditions - very prone to develop scars especially under the wool of the new areoles. When this wool falls away, as it does with age, the damage is exposed. My collected plant has already suffered, although virtually unscarred when received. I do not coddle my plants and prefer a few insects about to soaking everything in noxious chemicals, but I rather doubt that the cause of the trouble is due to insects as no other *Gymnocalyciums* suffer in this way. However, whatever the hazards of growing, this species remains - for me - one of the most attractive members of the genus *Gymnocalycium*.

Comments on *G. cardenasianum*

..... from H. Middleditch

"On the weekend before Easter, 1970, a lengthy day's outing from Durham to the tip of Anglesey led to the purchase of this *G. cardenasianum*, amongst other plants. Hallett probably had thirty or forty plants of this particular species; some appeared to be thickly spined and some much more sparsely spined. On closer examination it became evident that the plants with the greater number of ribs, which therefore had a larger number of areoles, carried the thickest spination. This was not necessarily just a question of size of plant. The smallest plant observed was about 2½" in diameter and had seven ribs, but those between 4" and 5" in diameter varied from nine to thirteen ribs. Very little variation was observed in the spacing of the areoles on the ribs, these being about 15 mm apart - the plants then being very flaccid.

"All the plants were a pale grey green colour, with no sign at all of reddish or dark pigmentation. Several plants were observed to be carrying a central spine, but this was absent on many others, including the plant on our cover.

"In previous issues of this Journal various comments have been made on self-sterility or otherwise of *Gymnocalycium* flowers. It does occur to me that, in the situation described by Geoff Swales, that all the other *Gymnos* in flower were probably low-altitude plants and that no other high-altitude *Gymnos* other than *cardenasianum* were in flower at that time.

"It is of interest to compare the flower depicted on this plant with that drawn by Hans Till, especially in regard to the length of the flower tube. The length of tube which appears on the

flower on the cover would appear to match Till's *G. bayrianum* more closely than his *cardenasiatum*. A stop-press comment received from Geoff Swales suggests that the seeds from this plant and those from the fruit of the *G. spegazzinii* ex W. Withers depicted on a previous page, appear to be remarkably similar, and do not quite match the seeds of both these species previously obtained from other sources. This opens up various intriguing avenues of thought.

"My own small plant of *G. cardenasiatum* is quite a small seedling; it had to be planted out of its seedling pot into a 3" long tom pot when the thickened root was found to be almost filling its original pot. However, it happened to get placed very close to the glass on the south side of the greenhouse and over the summer it developed a very dark purplish tinge; it also began to look as though it was not really happy. It has now been moved to a much more shady situation but it has failed to regain its previous green colour. I noticed with interest that David Rushworth also had his plant of this species in the shady part of his greenhouse!"

..... from E.W. Putnam

"The notion of cultivating *Gymnos* in the shade or in half-shade is fairly widespread. I have found little justification for it, though some growers claim that their plants scorch and stop growing in full light. John Donald grows his in full light, and the Sussex coast is probably the hottest and sunniest part of this country. In shade *Gymnos* get very green and fat. I like to see the strong bronzy and bluey-green colours myself."

..... from B.C.F. Hill

"I have now put all my *Gymnos* under the staging in a glass-to-ground greenhouse and they are growing much better."

WALTER RAUSCH - HIS 4th EXPEDITION TO SOUTH AMERICA - PART 2 by G. Streiter (Translated by E.W. Bentley from G.O.K. Newsletter for Dec. 1970).

Lobivia maximiliana, together with *L. caespitosa*, is the highest growing *Lobivia*. The highest *Lobivia* habitat that Herr Rausch has so far encountered was 4,600 m with *L. maximiliana*. The smooth flowers with three colour zones are characteristic of this species; it is violet outside - at the tips of the perianth leaves (petals) - then follows a red zone, right inside it is yellow. Each of the colours can more or less predominate.

Lobivia (*Acantholobivia* Bckbg.) *tegeleriana* produces spiny fruit, but there are spineless ones. It often happens that plants with small flowers produce spineless fruits, while spined ones develop from larger flowers. Both forms stand next to each other in habitat and there are not enough grounds to separate it from *Lobivia*. *Lobivia oyonica* (R 387) is rather difficult to find and only detectable through its flowers. It is very rare, only ten plants were found.

Lobivia zecheri, R 407, a new discovery, is conspicuous for its grey-white epidermis. It makes a pretty sight with its flower with red style and stigma. In its seeds it agrees with no other *Lobivia* however. Rauh describes as *L. lauramarca* (R 424) a rare species with fairly open spination and red flowers. Herr Rausch has established that it is much more widely distributed beyond *Lauramarca*. He came across it at sites where the plants were very variable in spine length and flower colour, frequently including the naked form included in the description, which is certainly difficult to find. It belongs to the *L. caespitosa* group.

In the quite wide Urubamaba valley, also called the Inca valley - the fruitful valley that was the centre of the Inca civilisation, *L. incaica* is distributed in different spine forms from almost naked to long spines. The flowers are red, white within and the stamens somewhat sparse.

Then near Paucartambo the vegetation picture suddenly changed - it became multicoloured! The *Lobivias* growing there (R 422) in certain forms recalled perhaps *L. caespitosa*, undoubtedly stand near to it, but flower in all colours. The name 'multicolor' would fit them well. Also new is *Lob.*

sicuniensis (R 426). At first it would pass for *L. maximiliana*. On closer examination, however, differences become apparent; the plant body has a greyer appearance, the flowers lack the blue-violet edge so striking in *L. maximiliana* and the seeds also differ. This species again is most variable, the flowers can be orange or red, and the petals slimmer or broader.

Herr Rausch understands well how to present a lecture. He knows well enough that now relaxation is needed: clever shots of Inca ruins shrouded in soft cloud - Arequipa with the elegant silhouette of the snow covered Volcano Misti in the background - (here Christmas was celebrated) - flower pictures of *Passifloras* (in which there is name chaos as in cacti), of slipper flowers (known to us as room plants), of *Hypeastrum* and *Echeverias* - *Tillandsia* on cacti, trees and rocks - a vertical rock face, completely hung with bromeliads and orchids - cleverly taken snapshots revealing the life of the Indians, of colorful drovers on market day and of the tireless drums at the fiesta. Lake Titicaca, the highest navigable lake in the world, with its reed islands on which the Urus still live, naked wild Indians who do not wish to be civilised. The picture town of La Paz (here there is scarcely one level street - the lowest part of the town lies at 3,000 m, the highest at 4,000') and Sucre, perhaps the dream-target of the *Sulcorebutia* collector.

Now we have reached Bolivia and go once again into the field. Herr Vasquez accompanies our friends on some occasions, as a result of which they are able to enjoy the unheard of luxury of a jeep. Herr Vasquez at the time is concentrating on *Cleistocactus* and we must be on tenterhooks at the outcome. Up to now he has only demonstrated 4 or 5 good species, all others being only forms (*tupicensis*, *sucrensis*, *tarijensis*,).

Neocardenasia - giant sized and terribly spiny - must be climbed for the purpose of seed harvesting. *Trichocereus orurensis* is often burnt out. It is charred quite black below, but the hairy new growth is very fine.

In my review of Bolivian *Lobivias* I will begin perhaps best in the north with *L. pentlandii*. This species is extraordinarily variable in flower form and colour. Herr Rausch plucked and photographed in one habitat a bunch of flowers that shone in all colour nuances from white, through yellow, orange and red, to deep violet - no wonder that he has found 16 synonyms! (*argentea*, *leucoviolacea*, *leucorhodon*, *carminantha*, *varians*, ...). Hooker, in his original description in *Curtis Bot. Mag.* (1844) produced a specimen with violet-pink flowers. However, *Lob. maximiliana* is no synonym of *L. pentlandii*, although Backeberg obstinately held that this was so. Herr Rausch has carefully gone into the matter while traversing the area of both species. *L. maximiliana* colonises hill tops and peaks east and west of Lake Titicaca northwards. In the same habitat, namely, high peaks, grows *L. pentlandii* but in a region that stretches to the south of Lake Titicaca. In the border regions, about level with the southern third of Lake Titicaca, the two areas overlap. Herr Rausch has actually discovered a few places in which *L. maximiliana* (with the markedly three-zoned flower) and *L. pentlandii* (with its flowers typically rich colour scale) grow together. But never could he find transition forms or hybrids! They have different flowering periods.

Lobivia miniatiflora Ritter (R 452) makes clumps of up to 100 heads. Its name arises from the red-lead coloured flowers. *L. laevis* is notable for its consistently violet-pink flower that only varies in lighter or darker shades. The *Lobivia* with the collector's number R.500 is one of his finest new discoveries; it has two large spines that stick up like the horns of a water buffalo and three small ones. As far as can be seen it has no connection with any other known *Lobivia*. *Lobivia droxleriana* has again been collected. It is notable for the dark-red flowers and the reddish central spines; it stands near *L. cinnabarina* but has somewhat larger seeds. The floral leaves in *L. pusilla* can be either slender-tipped or broad-leaf forms.

No less exciting for us than the *Lobivia* discoveries is the yield of *Sulcorebutias*. The quite charming, tiny, *S. rauschii* was collected once more, also *S. steinbachii*, which is peculiar for the extraordinarily variable flowers; it blooms red, violet, pink, orange and also yellow. Interesting also is the new discovery with the collector's number R 472. This *Sulcorebutia* is thickly white-spined and at a cursory glance resembles the white spined form of *S. kruegeri*. But a glance through a lens shows that the spinelets are plainly ciliate; its flowers are uniformly dark blood-

red and larger than *S.kruegeri* (which flowers yellow). *S.aranacea* R 460 is also thickly white-spined, its spinelets too are finely ciliate - 'sandy' Cardenas called this characteristic and for that reason it has the name *arenacea*. Otherwise it has nothing whatever to do with the former plant.

Sulcorebutia crispata is characterised by its especially fine, curled spines, spine colour whitish to somewhat pink, flower violet-pink. *S.frankiana* is striking for its fresh green epidermis, the spines are mostly reddish, the flowers red, also magenta. New is *Sulcorebutia* R 465 - it becomes fairly large, its body appears olive-green which is emphasized by the yellowish-white spines. A few plants have already flowered for Herr Rausch; he could not observe any colour variations. The flower is dark wine red.

In *Sulcorebutia* R.491 the discovery site is interesting: Tarija. Up till now one could assume that the distribution area of *Sulcorebutias* ends southwards in the district around Sucre. And now another *Sulcorebutia* suddenly pops up much further south, almost on the Argentine border'. It has not yet flowered and so we must await further details with tense expectation.

The genus *Blossfeldia* is not easy for the collector. The tiny dwarfs are scarcely discoverable, still more difficult to photograph, because they mostly grow in shady places, squashed in rock clefts, on steep river banks. The genus has a wide distribution zone: Herr Rausch has been able to collect *Blossfeldias* at fifteen sites, from the Rio Caine in the middle of Bolivia to far into Argentina (Catamarca). We have now reached Argentina in our journeying and perhaps I might discuss this with you later?

MORAWETZIA DOELZIANA FLOWERS by LLe Page

My plant of *Morawetzia doelziana* was obtained some seventeen years ago from Churchman's nursery. Until three years ago it was pot grown but as its procumbent stems had become an embarrassment it was transferred to a relation's commercial glasshouse and given a free foot run. Once bedded out, it grew apace and now has seven stems measuring between two feet and two feet six inches in length. Two of these stems developed cephaliums in the crown at the latter end of 1970 and a further stem developed a terminal cephalium in 1971 - I quite expect the others to do so as well, fairly soon. The plant also has four further stems of between two and six inches in length. I have attempted to keep the plant within bounds by sticking three canes into the soil in the form of a triangle and tying the stems in.



Morawetzia doelziana Backg.

Buxbaum - Krainz "Kakteen"

The portion of the stems that lie on the soil are rather corky and scarred but the remainder is quite nice and clean. I think that the spines and hair are a rather attractive combination. The normal growing tip of the stem is more or less tapered to a point, whereas the top of the flowering stem is swollen very slightly just below the cephalium. Apart from that, the stems retain the same diameter all the way up.

The flowers have cropped up at fairly regular intervals throughout the summer of 1971, from the terminal cephalium, usually two flowers at a time. I believe that the first flower appeared early in June and the last was in October, this year's total being fourteen or fifteen. The buds are quite hairy and are a brownish colour. They are roundish in shape and seem to appear quite suddenly - they remain like this for some time and then elongate fairly rapidly. I have not had an opportunity to follow their development too closely this year. The buds are almost hidden in the long brownish bristles and white hair of the terminal cephalium.

The flower is long and thin, about 70-80 mm long and about 15 mm in diameter, somewhat zygomorphic, with a hairy brown tube and deep carmine petals. The stamens cluster round the style in a rather attractive manner. The flower opens early in the morning and usually lasts two days, closing partially at night; with suitable conditions the flower can last longer.

Comments on *Morawetzia doelziana*

..... from H.Middleditch

"*Morawetzia doelziana* was first described by Backeberg in the 1936 Yearbook of the German Cactus Society (D.K.G.). In Vol II of his 'Die Cactaceae' Backeberg gives the following information about this plant:-

"On my Peruvian trip in the Winter of 1935/36, which I undertook on the commission of the late North American collector Victor Morawetz, I found at the Rio Mantaro in middle Peru the northernmost cereus with a close relationship to the *Oreocerei*, a hitherto monotypic genus. In 1954 Rauh found in addition a hairless variety of the formerly hairy species.

"The generic characters are: low-growing, broad-bushy, columnar plants, usually only offsetting from below, also sideways from itself by the dying-off of the cephalium; stem loosely furnished with hair or hairless, thickened at the end more or less club shaped when of a flowerable age. Cephalium flat and not large, at the end of the stem, interspersed with bristles; flowers from the crown cephalium, carmine-red, slightly curved with slanting opening, this opening slightly funnelform, the style more or less overtopping the stamens; the tube is hairy and round; the fruit similar to that of the *Oreocerei* i.e. it is yellowish green and opens basally; the seeds are matt black, loose in the fruit when ripe."

"The type locality is given as Mariscal Caceres on the Rio Mantaro and from there over towards Ayacucho. The variety *calva* Rauh & Backbg originates from La Mejorada in the Mantaro valley and from the arid region around Huanta.

"The illustration accompanying this description shows a plant in habitat with two or three dozen stems, all of which appear to be about two to two-and-a-half feet high. It would seem, therefore, that this is the normal maximum height to which a mature stem will grow, and that once having reached this height it can be expected to form a terminal cephalium, after which growth appears to cease. Further accompanying illustrations depict the flowering heads of the stems and show that an appreciable variation may be found in the number and length of the stiff brown bristles in the cephalium. A slide of the plant from the collection of I. Le Page, shown in flower, carried a fairly thick array of reddish-brown bristly spines, so the denseness of this armament would not appear to be a question of the age of the cephalium.

"My own plant has three or four older stems barely twelve inches high. These are going very corky over much of their lower parts and do not look terribly happy. The newer offsets are as yet much shorter and appear to be growing fairly well. Now I am fairly convinced that the plant

has a relatively diminutive form for a cactus, I feel inclined to put it in a larger pot with a less arid compost to see if it will produce a better quality of growth.

"Not long ago I acquired a plant under the name of 'Morawetzia sericata'. This bears not the slightest resemblance to any Morawetzia I have ever seen, it being much closer in general appearance to a long, thin, Weberbauerocereus rauhii. I am still somewhat suspicious as to the accuracy of the name under which the plant was acquired."

WHAT IS A CEPHALIUM? - Part 2 by Prof.F.Buxbaum

(Translated by K.Wood-Allum from K.u.a.S. 16.2: 1964. Adapted by H.Middleditch).

Following the discussion on the podaria and the areole (Chileans No.19 pp 203-208) we now come to the flower.

We should consider the flower as a starting point to our explanation of the cephalium. In the very early stages of the formation of a flower bud, many internodes are formed. (It may be desirable here to explain the term 'internode'. In a blade of grass there occurs at each spot where a leaf originates, a knot-like thickening of the blade or stem, this point being described as a node - Latin nodium. The distance between two nodes one therefore calls 'between nodes' - Latin internodium. These expressions 'node' and 'internode' apply generally to all plants, even when the stem is not thickened at the base of the leaf. Internode is also generally that part of the new growth between two leaf development points, equally so whenever these do not lie on the same flank of the stem.) The internodes formed at the very early stage of the development of a flower bud on a cactus plant correspond to the upper leaf zone on a mesophytic flower stalk. This section of a flower stalk is termed pedicellis in Latin, hence this part of the flower stalk is referred to as the pedicellary zone. In a cactus flower this pedicellary zone becomes displaced to the upper part of the outer wall of the ovary where it forms the pericarpel.

On a great many more cacti than was earlier realised, however, very many more internodes are formed at the stage before flower formation than are found in the later stage of flower development. These internodes correspond to the lower leaves on a flower stalk - Latin caulis - and this part can be called the cauline zone. Since the rudimentary flower bud is still extremely minute at this stage, the rudimentary leaves and internodes are microscopically small.

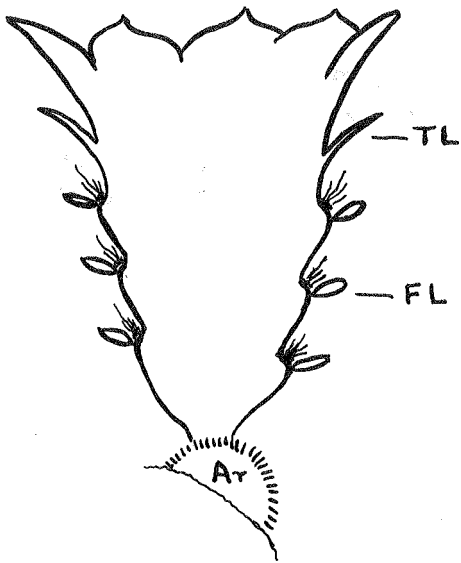
Whilst the rudimentary leaves and internodes of the pedicellary zone later grow considerably, the internodes of the cauline zone become minute scales and usually they are only barely discernible with the aid of a microscope. But in the axils of these scales tiny areoles develop. These sometimes produce only hairs but sometimes they also produce bristly thorns. The result of this is that the cauline zone grows thicker but remains so short that the innumerable tiny areoles form either a felt-like ring or a long hairy wreath round the cauline zone.

This cauline zone will appear when flower formation begins, whether or not it is followed immediately by flower development. The cauline zone may be formed months or even years before a flower appears. At some areoles carrying a cauline zone a flower may appear some months after the cauline formation appears; other areoles on the same plant may not produce a flower for a year or two after the cauline zone is formed, yet other areoles may carry a cauline zone development and yet never mature into a flower.

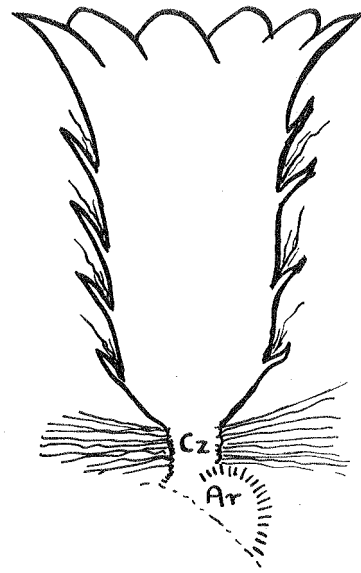
The form taken by the cauline zone depends upon the length of the hairs in that zone. If the plant develops a cauline zone which forms hair much longer than the hair or wool on the normal plant areoles - and if this cauline zone is also formed prior to the development of the flower buds - then the form taken by the cauline zone is described as a cephalium or pseudocephalium.

Thus we see that the bulk of the hair forming a cephalium comes not from a typical body areole but from the microscopic areoles of the cauline zone of the developing flower.

Whether or not the cephalium is retained after flowering depends upon the position of the



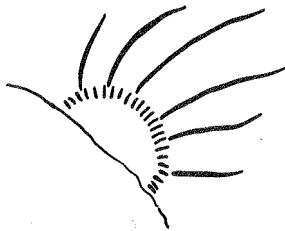
TYPICAL OPUNTIA
FLOWER



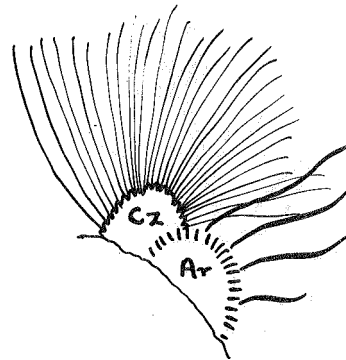
FLOWER EXHIBITING
CAULINE ZONE

Ar - Areole

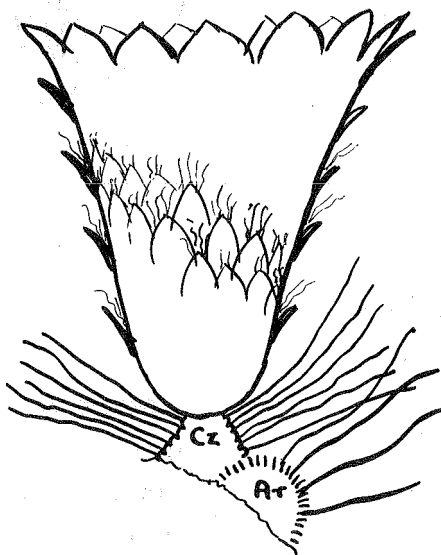
Cz - Cauline Zone.



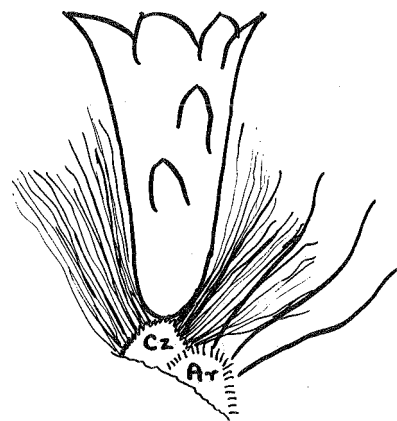
NORMAL AREOLE



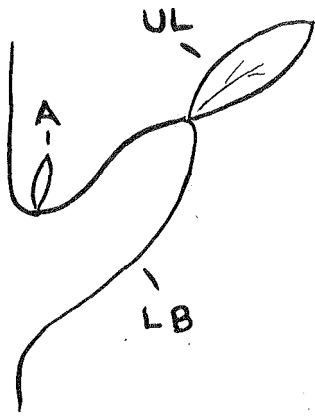
AREOLE WITH SECONDARY
GROWTH IN FORM OF
CAULINE ZONE



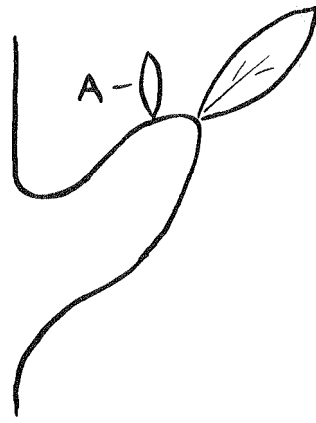
FLOWER ON COARSE CEPHALIUM
WITH MANY SCALES AND HAIR
IN AXILS - ESPOSTOA



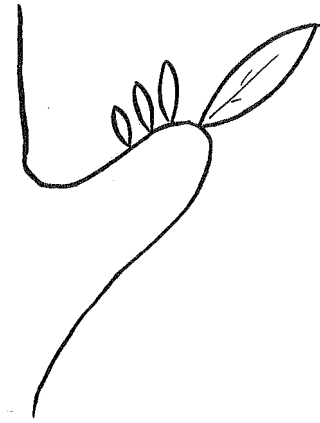
FLOWER ON WOOLLY CEPHALIUM
WITH FEW SCALES AND
NAKED AXILS -
COLEOCEPHALOCEREUS



NORMAL POSITION OF
AXILLIARY BUD
A - AXILLIARY BUD
LB - LOWER LEAF
UL - UPPER LEAF

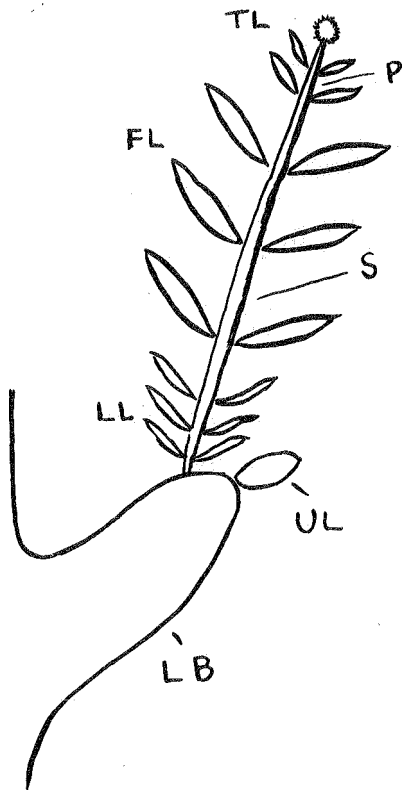


AXILLIARY BUD
DISPLACED
RECAULESCENTLY

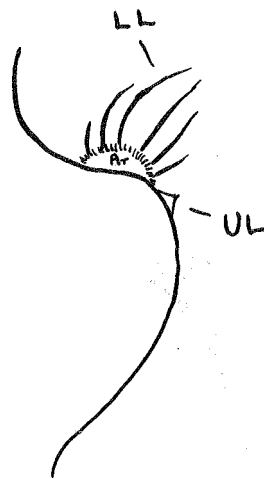


FORMATION OF
SECONDARY
AXILLIARY BUDS

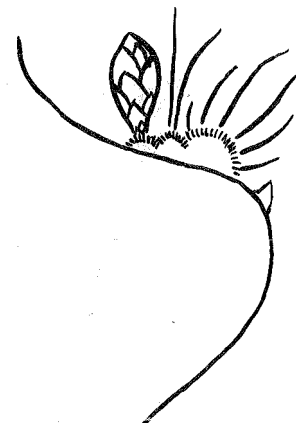
DIAGRAM OF POSITION OF AXILLIARY BUD (after Buxbaum).



FLORAL AXILLIARY GROWTH
S - STALK (CAULIS)
P - FLOWER STALK (PEDICEL)
LL - LOWER LEAVES
FL - FOLIAGE LEAVES
TL - FLORAL LEAVES



AXILLIARY GROWTH
IN THE FORM
OF AN AREOLE
THORNS ARE
EQUIVALENT OF
LEAVES ON
AXILLIARY STALK



SECONDARY
AXILLIARY GROWTH
- MORE THORNS
AND A FLOWER

DIAGRAM SHOWING AREOLE FORMATION. (after Buxbaum).

See "What is a Cephalium"

abscission layer in the flower stalk. When the abscission layer lies between the cauline zone and the pericarp, then the cauline zone will remain on the plant body and the flower will fall off, so leaving the cephalium on the plant. When the abscission layer occurs between the cauline zone and the areole, the cephalium will be confined to those areoles which have not yet developed a flower which opens - as in *Pseudomitrocereus fulviceps*.

Only when the plant reaches sufficient maturity to bear flowers will the long hairy cauline zone development take place, which we term a cephalium or pseudocephalium. A cephalium will thus appear initially at some point above the base of the stem when the plant has reached flower-bearing age. However, as previously indicated, the flowers may appear at a much later stage than the cephalium.

The form of the cauline zone depends not only upon the length of the hairs formed but also on the number of internodes in the cauline zone. The more internodes that occur on the cauline zone, the less there are on the flower. If we were to consider a fairly narrow relationship - for example, that between various species of a genus - we can expect to find on some species a fairly large number of scales (internodes) on the flower and on other species a quite small number of scales (internodes) on the flower. On other species there will be a number of various in-between stages. This may be described as a series of reductions in the number of internodes on the flower stalk from one species to another within a genus. This may be observed, for example, in *Cephalocerei*.

(To be continued)

Comments on 'What is a cephalium'?

..... from H.Middleditch

"The explanation regarding the 'adaption' of the translation, which accompanied the first part of this article, applies equally to this second part.

"In commenting upon the first part of this article I observed that Buxbaum's postulation of the location of the abscission layer between the leaf base and the leaf petiole (i.e. within the body of the leaf rather than the almost universal location in the plant kingdom of between the leaf and the stem) appeared to be open to question, although it appeared to have a small degree of support from D.G.McKean's use of the terminology when describing parts of a normal bulb.

"In this part of the article we once again find Buxbaum putting forward an idea which does not appear to be of common occurrence in other plants viz: the location of an abscission layer between the cauline zone and the pedicel of the flower. It would surely be somewhat remarkable if no other botanical author had made a reference to this aspect in literature. However, this does not justify the assumption being made that Buxbaum is incorrect - it merely makes it difficult to assess the viability of the contents of the article in the absence of other competent opinions on the subject.

"Certainly the explanation put forward in the above article by Buxbaum concerning the nature of a cephalium would appear to fit the characteristics which one can observe on a cephalium bearing plant.

"The accompanying sketches show how cephalium formation is related to growth forms of typical mesophytic and xerophytic plants. In the first series of diagrams, the most common forms of axillary growth found in mesophytic plants and the less common forms of axillary growth found in succulent plants, are shown. The first diagram depicts a node typical of a mesophytic or leaf-bearing succulent plant, with new growth budding in the axil. The second diagram depicts a feature of much more limited occurrence in nature with the axillary growth displaced from the location normal in the axil towards the junction of the upper and lower leaf parts of the i.e. recaulescently. In the third diagram, further axillary growths are shown which have developed between the displaced axillary growth and the axil.

"The lower set of three diagrams relate this last form of axillary growth more closely to that which may be observed on globular or cereiform cacti. In the first of these three diagrams the displaced axillary growth is shown producing a stalk which is terminated by a flower. On this stalk are shown the lower leaves, then the foliage leaves, and finally the uppermost or floral leaves. This is a typical form of recalcitrantly displaced axillary growth and it may be seen in nature as shown on this diagram. The next diagram shows an axillary growth similarly displaced but now taking the form of an areole, where the foliage leaves are reduced to the form of thorns. These thorns are commonly referred to as spines in literature but if one wishes to adhere to botanical accuracy, this description is incorrect.

"The termination of the axillary growth in the form of a flower can occur quite soon after the formation of the areole and thorns (*Parodia*, *Mamillaria*), just a little later in the growth of the plant (*Oroya*), some time after the formation of the areole (*Mamillaria*), much longer still (*Sulcorebutia*) or an appreciable time after the formation of the areole (*Rebutia*). After the formation of an axillary growth in the form of an areole, further axillary growth may occur, displaced a little way from the existing areole, as shown in the final diagram. New spines will grow in this way on an old areole on *Trichocereus* or *Cereus*; more than one flower will appear on the same areole on *Neoporteria*. Such new growth will always be above the existing areole, i.e. between the areole and the axil (see illustration Chileans No.19 p 204).

"The next set of diagrams illustrates the various forms which the internodes may take on the floral axillary growth. The first of these diagrams depicts a typical *Opuntia* flower and shows the foliage leaves in the form of small bracts growing from each areole. *Opuntia* are the only cacti without leaves (or merely with vestigial leaves) which exhibit the growth of vestigial foliage leaves on the flower. They are therefore classified as one of the three major divisions of the cactus family, between *Peireskia* and the remainder of the *Cactaceae*.

"The second diagram shows a flower of *Pseudomitrocereus* with the floral leaves in the form of scales on the tube, which is the form typical for most cacti. At the base of the flower and growing as part of the flower is a region corresponding to the caulis or stalk of the floral axillary growth shown in the preceding set of diagrams. This caulis carries a considerable number of nodes, each of which produces hairs or bristly hairs. This growth region can be described as a cauline zone.

"In some plants the cauline zone appears at the same time as the flower, but in other plants the cauline zone can appear first and then the flower will appear later - perhaps even years later. The cauline zone, being a floral axillary growth only appears on flowering areoles and thus only when a plant is sufficiently mature to flower. Where a continuous band of closely pitched areoles each produce a cauline zone, the combined effect is described as a cephalium. Where the areoles are well spaced and each tuft of cauline hair or wool is visible on individual areoles, or the areoles do not produce a continuous band of cauline growth, the term pseudo-cephalium is usually adopted.

"In *Pseudomitrocereus*, the abscission layer is between the cauline zone and the areole, so the hairy growth falls away with the flower. In *Pilocereus*, *Espostoa*, etc., the abscission layer is between the cauline zone and the flower, so the hairy areole remains after the flower dies and the cephalium remains a permanent feature of the plant.

"The reference made by Buxbaum to the relationship between the number of internodes on the cauline zone and the number on the pedicellary zone is of interest, since it does appear to match the observed characteristics of cephalia and flowers on cephalium-bearing plants. For example, the flowers on *Espostoa*, *Vatricania* and *Thrixanthocereus* carry a fairly large number of scales and also a fair amount of hair in the axils of the flower scales; the cephalia on these plants consist of fine bristles - or one may perhaps prefer to describe them as coarse hairs. Thus there are numerous scales (internodes) on the flower and from the coarseness of the cephalium one supposes that there are not many internodes on each cauline zone. The cephalia on *Pilosocereus*, *Micranthocereus* and *Coleocephalocereus*, on the other hand, are composed of much greater quantities of much finer hairs, softer and less stiff than the Andean cephaloids, while the flowers have very few

scales on the tube, fewer petals, and almost no hair at all in the axils of the scales. The Brazilian cephaloids thus appear to have few internodes on the flower and far more numerous internodes on the cauline zone, as shown in the last two diagrams."

MATUCANA WEBERBAUERI - SUBMATUCANA MYRIACANTHA

For some years now young seed-grown plants of both these species have found their way into our collections and nowadays imported plants are also rather more readily available. The more plants there are to be seen the more striking the similarity becomes between the plants distributed under these two names. Both species originate from the same locality in north-eastern Peru, on the mountain sides above the town of Balsas. Both species were first described under the generic name of *Echinocactus* by Vaupel in 1913 in the *Botanical Year Book*, Engler, 50: III: 25.

Britton and Rose placed *E.myriacanthus* under *Arequipa*; presumably their description was a repetition of that given by Vaupel and ran as follows: "Simple, depressed-globose, 10 cm in diameter, 8 cm high; ribs 26, strongly tubercled, separated by an acute sinus; areoles closely set, broadly elliptic; spines slender, bristle like, when young brown, in age dark grey, 25 or more, the longer ones 3 cm long; flowers slender, tubular, 5 to 6 cm long; axils of the scales on the flower-tube and ovary bearing long silky brown hairs."

Curt Backeberg classified this plant under *Submatucana*, on account of the hair-like bristles, up to 2 cm long, in the axils of the flower scales, together with the dry fruit which opens by a vertical split to release the seeds. In addition, this plant comes from the opposite end of Peru to all the other *Arequipa*. *Das Kakteenlexikon* gives the flower colour as pink.

Britton and Rose also gave a description of *E.weberbaueri* which is again presumably a repetition of that given by Vaupel, as follows: "Depressed, 10 cm broad, 7 cm high; ribs 21, divided into terete tubercles; areoles rather close together, broadly elliptic; spines about 30, the longest ones 3.5 cm long, straight; flowers tubular, 5.5 cm long; ovary and flower tube bearing lanceolate acute scales, these without hairs in their axils." They added "we have been able to study a fragment of this species - it much resembles *Matucana haynei*". It was again left to Curt Backeberg to transfer it, this time to *Matucana*, on account of the naked flower tube. *Das Kakteenlexikon* gives the flower colour as citron yellow.

One may find in "A commentary upon the subtribe *Borzicactinae*" by J.D.Donald in the *N.C.& S.S.Journal* 25:3:1970, the observation that "the flowers of *M.myriacantha* & *M.weberbaueri* bear quite long hair in the scale axils". This comment would appear to need some clarification.

Comments on *Matucana weberbaueri*

..... from G.Sharp

"My plant of *M.weberbaueri* was obtained from one of the *Dodonaeus* during our 1965 Cactus Tour, as a small grafted seedling. Since that time it has grown steadily and is now about 4" high and 3" across. It flowered for the first time in the summer of 1971 with two single flowers followed by two more - together this time - in August. The flower lasted for three days. In my opinion I would have described the flower more as orange rather than pink. I did not observe any hairy bristles on the tube but will take a good look at the next flower (there is already another bud appearing). I enclose a slide of this plant in flower for the slide library, showing the petals wide open, almost flat."

..... from G.W.Sykes

"My *Matucana myricantha* has been in flower again on a number of occasions this year. The flowers open fully in the zygomorphic tradition, being about 5.5 cms in height. The flower was about two-third to three-quarters the height of my *M.aurantiaca* flower and much slimmer, too. However, I can positively say that the flower colour is virtually identical to *M.aurantiaca*, being orange-red (not pinky). The tube was quite hairless !".

"I would agree that *M.weberbaueri* is markedly similar to *M.myriacantha* in appearance."

..... from H.Ewald

"One of my *M.weberbaueri* imports, obtained from de Herdt in late 1970, put out three flowers in the spring of 1971. The flower was only slightly zygomorphic, the slender tube being almost cylindrical. There was no wool at all around the young buds and the flower was likewise hairless. The flower was pure yellow in colour.

"I have imported plants both of *M.weberbaueri* and *M.myriacantha*; the *weberbaueri* seems to me to be rather more open in its spination."

..... from A.W.Craig

"My own plant came as *Matucana myriacantha* from Sargent under the number DWS 25. The plant was an import which rooted in a month or two from receipt and has now been in my collection for about two and a half years. In this time it has put on almost an inch of new growth in height, the new spines being about as long as those on the habitat growth, of similar colour and perhaps slightly slimmer. Areole spacing is about the same on both new growth and habitat growth. The pup which was visible at the base of the plant on receipt is now about 1½" in diameter. In midsummer a bud appeared to be growing from an areole near the crown but this subsequently proved to be a new offset. However, a further new growth in the crown did prove to be a bud which then grew into a flower.

"The flower tube was very nearly straight and I saw no obvious signs of hair or bristles on the tube. Both the flower tube and petals were a yellow-orange colour. The flower petals opened wide so that the flower was rotate, but the stamens remained tightly bunched together standing up above the open petals, just as in the slide from G.Sharp. The flower was cross pollinated with *Wintertia aureispina* and set a fruit, which was about 15 mm high and 7 mm broad at the centre; the fruit was elongated, tapering in towards the top, dark green in colour with a slight bronze-red tinge, having a few pointed yellowish scales 1.5 mm broad at the base, 3 to 4 mm high."

..... from H.Middleditch

"Those plants within *Matucana* Br. & R which have hair in the scale axils of the flower tube and are called *Submatucana* by Backeberg, emanate from southern and central Peru as far north as the Cordillera Negra and Cordillera Blanca. The *Echinocactus myriacanthus* of Vaupel represents a *Submatucana* coming from outside this area. One cannot help wondering if there might possibly have been some misinterpretation of the original habitat material which led Vaupel to credit this particular plant erroneously with hair in the scale axils of the flower tube. The statement by Donald quoted above is even more perplexing."

..... from J.D.Donald

"I must agree that the statement as it stands in the National Journal appears at variance with the evidence of the flowering plants. My statement is incorrect in that it couples together *M.weberbaueri* and *M.myriacantha*, in connection with hairy scale axils (*Submatucana*), whereas in the Vaupel description - *M.weberbaueri* is naked in the scale axils but *M.myriacantha* bears

long hairs. Plants commonly grown under these names produce flowers which show little obvious hair in the scale axils. However, further examination of these scale axils on tube and pericarp do show the existence of tomentum and fine microscopic hairs. They may also be seen on the pressed flower from G.W.Sykes. The extent varies from plant to plant but not as far as to be described as long silky hairs. One further observation which may be significant is that flowering areoles produce longer, finer, bristles over and above the normal spine complement (c.f. other Borzicactinae). This could mean that we do not grow *M.myriacantha* but only *M.weberbaueri* if these long fine hairs at the base of the pericarp are not part of the flower. Did Vaupel include them as such?

"The flower colours are also puzzling - none of the flowers produced by plants commonly cultivated as *myriacantha* or *weberbaueri* produce rose or yellow flowers in the strictest sense. All *myriacantha* appear to produce deep orange red perianths with orange tubes whereas most of the *weberbaueri* produce pale orange flowers with yellowish orange tubes. The slide of G.Sharp's plant in flower is typical of *M.myriacantha* as collected by Lau from Chacapoyas and Balsas as 109 (or DWS 25). Lau has since suggested that this might be better described as *M.weberbaueri* "mit orange bluten" because it is virtually indistinguishable from his 218 collected at Carrizal Balsas, in appearance. However, only 218 has bright yellow flowers in both perianth and tube and thus corresponds with the Lexikon description of *M.weberbaueri*.

"There is a complication here because of a mix-up in the distribution of *M.weberbaueri* 218 and *M.pallariensis* 225 - quite a number of the latter are really the former. The true *M.pallariensis* has a thicker greenish-yellow tube and yellow tipped orange perianth. Lau 225 from Pallar is typical of this form. The thicker tube of the true *M.pallariensis* flower clearly points to a closer relationship with *M.aurantiaca* of which the Lau San Pablo form 177 (or DWS 47) is typical. Again the scale axils in both these latter two plants appear naked, but on closer examination white hairs and tomentum are to be found.

"Kimmach has suggested that *M.aurantiaca* and *M.myriacantha* are synonymous but there is a marked distinction in the flower tube between the two plants grown under these names. *M.aurantiaca* has a thick yellow tube ca. 12 mm in cross section, whereas *M.myriacantha* has an orange tube only 5-6 mm in cross section. There are also distinctions in body habit with *M.aurantiaca* having broad rounded ribs and long narrow areoles whilst *myriacantha* has narrower, more tuberculate ribs with round areoles. Whereas there is not a great difference in spine count, colour, or length - *myriacantha* does appear to be the more spiny plant because the areoles are closer together.

"*M.weberbaueri* is very similar in body appearance to *M.myriacantha* and differs only in the colour of the flower, with Lau 109 deep orange, Lau 218 pure yellow, and the Van Donkelaar form pale orange. I agree with Horst Ewald that *M.weberbaueri* has possibly a more open spination.

"*M.pallariensis* bridges the two distinct types, having the thick tubed flower of *M.aurantiaca* with the body of *M.myriacantha*, narrow tuberculate ribs with round areoles. Spination is more adpressed laterally but equally dense as for *M.myriacantha*.

"The exact identification of *M.myriacantha* must remain in doubt unless it can be proved that Vaupel was mistaken in describing the flower as having long silky brown hairs. On the other hand *M.weberbaueri* appears to be established and to possess three differently coloured flower forms.

"A further article on the relationships between *MM.aurantiaca*, *pallariensis*, *weberbaueri* and *myriacantha* will appear in the National Journal."

A CONTRIBUTION TO THE UNDERSTANDING OF ECHINOCACTUS SCHUMANNIANUS NIC., ECHINOCACTUS GROSSEI K.SCH. AND ECHINOCACTUS NIGRISPINUS K.SCH.
by A.F.H. Buining.

(Translated from Succulenta 49:11. 1970 by W.W. Atkinson).

From the historical viewpoint there are no problems remaining concerning the above-named species. Backeberg also comes to this conclusion in his 'Die Cactaceae'.

Britton and Rose carried these plants as separate species under the genus *Malacocarpus*, then Berger - in his 'Kakteen' - came to the conclusion that the three plants belonged to *Notocactus*, with the variation that *nigrispinus* was considered as a variety of *schumannianus*. Fric, who collected these plants himself in their habitat, placed *schumannianus* and *grossei* under his group 'cephaloideae' in the genus *Notocactus* (Revision, 1935), without, however, naming *nigrispinus*. Finally, Backeberg brought *schumannianus* alone under his genus *Eriocactus* and placed both *grossei* and *nigrispinus* as synonyms.

On the face of it this could be the final word on these plants were it not that here again a thorough knowledge of the plants in their habitat was lacking.

At the end of the last century and the beginning of 1900 they were imported mainly by F. Haage jr. and collected in Paraguay by Grosse who lived in Paraguari.

The descriptions of the three species were based - especially in regard to *schumannianus* and *grossei* - upon small and immature imported material, whilst apparently details on size were obtained in correspondence with Grosse. In describing *E.grossei*, Schumann states that this plant is very rare, and that *E.nigrispinus* was the most imported. Grosse provided an accurate description of details of habitat, from which it would seem that *E.schumannianus* and *E.grossei* occur there in crevices in the granite rock formations, whilst *E.nigrispinus*, in contrast, grows on sandstone rock formations and with exceptionally meagre root development on termite mounds in a very restricted locality.

There is no point in meticulously pursuing this history here, it can all be found by reference to the bibliography. In general it can still be stated that many descriptions were and are based on insufficiently checked material. It seems, in fact, that none of the exported plants of the three species under study, and certainly not of the first two, were characteristically representative, because immature specimens were sent. This becomes very clear from the measurements of the plants and the number of ribs. I tried myself in *Succulenta* 1957 pp 139/142, with a key, to bring clarity to the group, but again on the basis of available material and existing literature.

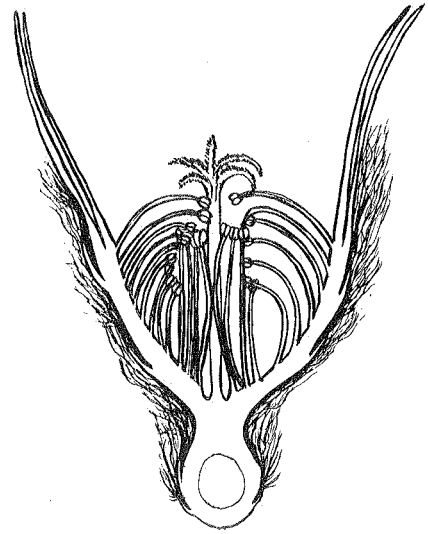
Was it surprising then, that when my wife, Leopold Horst and I made the acquaintance of A.M. Friedrich on Sunday evening of October 13th 1968 in Asuncion, Paraguay, and when he offered, among other things, to escort us to the habitat of these plants, we accepted eagerly with both hands?

There are few cactophiles as knowledgeable of Paraguay as Herr Friedrich, who has lived there for 40 years. Because of his age we were also accompanied by a cactus friend from Asuncion, Emilio Postigo, who was to take us to the distant habitats of *E.nigrispinus* and guide us on the difficult climbs. On the advice of Herr Friedrich this area had also been visited by Herr Esser, at that time of Heidelberg and then assistant to Professor Rauh and by Herr Hoffmann, at that time associated with the Botanical Garden at Heidelberg. They also brought back material, but so far as I know, they published nothing about the plants we are now concerned with.

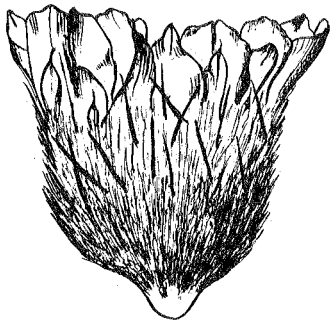
From Paraguari we drove in Horst's landrover to the Cerro Santo Thomas, one of the mountains which forms a part of the Cordillera de Altos range, of an average height of about 280 m. We climbed by way of a deserted granite gully and shortly came to a very steep wall where imposing cacti grew, from between the granite blocks, and which we immediately recognised as *Notocactus schumannianus* (Nicolai) Berger. Next to small trees and bushes, the exposed roots of which we had often to use to pull ourselves up with, we came across *Pleurotalis* sp., *Brassavola perinii*, *Miltonia flavescens*, *Cyrtopodium virescens*, *Gesnerias* and a white *Tillandsia* with blue flowers.



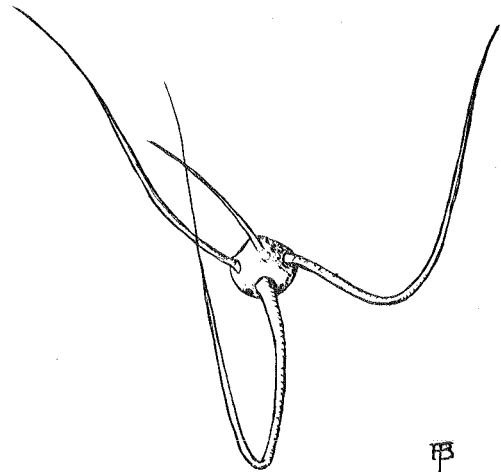
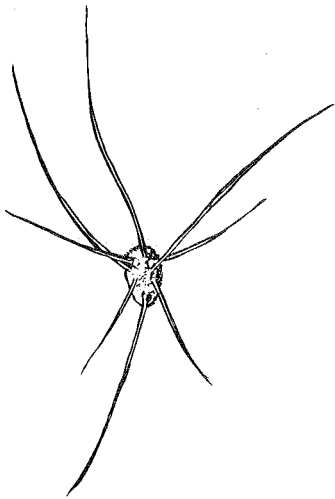
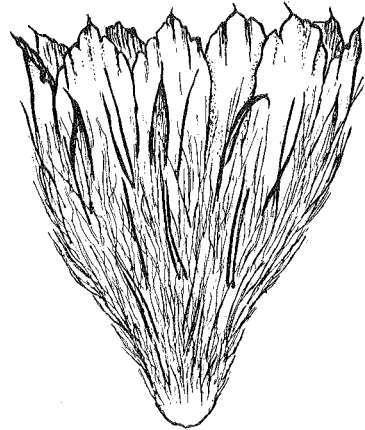
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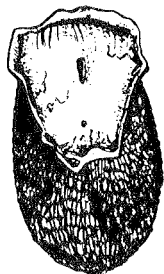
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NOTOCACTUS SCHUMANNIANUS

NOTOCACTUS NIGRISPINUS

Schumannianus grows there half lying and supported by bends like a big pipe.

The plant is very robust and even on top of the hills grows to 6 ft. tall and with 45 or more ribs. We were able to study the various plants in detail and make the necessary notes. According to Friedrich this species appears on the various peaks of the above mentioned range, including the Cerro Aca-ay where we were and where Grosse also collected in his time.

The names of the townships and villages in the hills are characteristic; they are old names of the Guarani Indians with a typical accent. The local inhabitants still speak Guarani almost exclusively. Next we drove via Caacupe (behind the forest) to Tobati (white face) - but before we got there we had to go on foot up a difficult but not very high cliff to reach a sandstone plateau. After a rather long walk over the rough, bare, and broken terrain, we eventually found *Echinocactus nigripinus* K.Sch. - at least this is in my opinion the correct name of the plant.

It grows here at the feet of small shrubs and among low grass which sometimes completely overwhelms the plants. To take photographs we often had to remove the dry grass in order to see anything of the plants at all. It is known that on just such places ants and termites like to make their nests, but these were in fact in very little evidence. In this limited area the plant appears frequently and makes fairly large groups.

Echinocactus schumannianus makes offsets only as a result of damage and these never grow to mature specimens. *Echinocactus nigripinus* makes nice clumps as witness the photos I took in habitat. Spine colour is very variable as described in print from old-silver black to yellow and white, but one immediately recognises the species which is much in evidence in the area.

After close study in situ and of the material brought back, I come to the following conclusions.

The material originally exported and described referred to very young plants and/or the offsets from *Echinocactus schumannianus* produced by damage. This is equally the case with *Echinocactus grossei*. From the description it seems that the material from which *Echinocactus nigripinus* was described comes nearer to mature habitat plants because these are considerably smaller. That only offsets and young plants of *E. schumannianus* and *E. grossei* were sent is understandable, because mature plants are too large and heavy for hired transport. That, as Schumann states on Page 103 of his 'Nachtrag' of 1903, the most imported specimens were of *E. nigripinus* is also understandable in that its offsets much more frequently appear and are much smaller and lighter. Moreover, remarkably enough, one seldom finds in the wild, small plants of large growing species.

Comparing the descriptions of the three species, *Notocactus grossei* (K.Sch.) Berger seems to be identical with *Notocactus schumannianus* (Nic.) Berger, or at best a form thereof.

From the following descriptions, photos, and drawings derived from my habitat notes and also from my collected material, it must appear that *Echinocactus nigripinus* K.Sch. is a genuine species and in no sense a variety of *schumannianus*.

NOTOCACTUS SCHUMANNIANUS (K.Sch.) Berger emend Buining.

Columnar, not offsetting unless damaged, up to 1.80 m high and up to 300 mm in diameter, with hairy roots. Ribs up to 45 or more, 10 mm apart, 10 mm high; base of rib 10 mm wide; slightly raised above the areole. Areoles at the crown very woolly, so that in older plants a white woolly top forms of up to 90 mm in diameter; areoles there 6 mm diam., later becoming bald and 2 mm diam., 10 mm apart. Spines eight altogether, brittle, thin; in the woolly top and adjacent thereto, standing vertically where they are brown to yellowish gold, later brown; because the spines are so brittle one seldom finds them undamaged, they are mostly partly broken off, especially from the older areoles which are bare. Radial spines 2 pairs on opposite sides, of which the lower pair is deflected downwards and about 10 mm long the upper being 7-8 mm long and deflected upwards. The uppermost spine is almost vertical and 7-8 mm long or less. Central spines 3, rarely 4, the upper two about 10 mm long, separating, the lower up to 30 mm long and deflected downwards; nevertheless around the crown all these spines stand vertically as do the radials.

Flower 35 mm long closed; 40 mm across, yellow gold; buds spherical with dark brown wool. Pericarpellum (ovary) inside circular, about 6 mm diam., outside with white wool which becomes brown above. On top is a little bristly brown hair. Receptaculum (tube) thickly covered with dark brown wool and a few dark brown bristly hairs up to 10 mm long; bell - to almost saucer - shaped, the wall is 12 mm long and 3-4 mm thick, the nectar chamber is up to $1\frac{1}{2}$ mm long and $\frac{1}{4}$ mm wide round the pistil.

Stamens appear in two groups, the primary stand at the foot of the pistil and grow more or less vertically upwards, the secondary appear round the wall of the tube and are with the anthers bent downwards, all about 10 mm long, anthers $\frac{1}{2}$ mm long, cream, bent towards the pistil and therefore pretty well closing off the nectar chamber.

Pistil without the stigma lobes 10 mm long, $1\frac{1}{2}$ mm thick, stigma lobes 12, 7 mm long, out-spread, white.

Floral leaves (petals) yellow-gold, spatulate, 20 mm long, 2 mm wide below, above 7-8 mm wide at the widest.

Fruit shiny brown and thickly covered with white silk-like hairs and red-brown bristles, rather flattened, 15 mm diameter, 12.5 mm high, drying and bursting around the base from whence the ripe seed fall out. The dried flower remains stay on the fruit.

Seed small, ca. 1.0 - 1.2 mm x 0.8 mm, hood-shaped, testa chestnut brown, shiny; the testa has an almost smooth appearance, because the humps on the testa wall are almost flat; the hilum is, in comparison with the size of the seed, fairly large, ochre-yellow; the micropyle sticks out of the swelling in the hilum; the funicular opening is usually not perceptible, being often hidden under the spongy tissue covering the hilum; around the outer seed shell there is never a thin film, nor the remains thereof.

NOTOCACTUS NIGRISPINUS (K.Sch.) Buining comb nov. emend Buining.

Short columnar, sprouting from the base and forming clusters, each branch up to 400 mm tall, up to 160 mm thick and with fibrous roots. Ribs 24, 20-23 mm apart, about 15 mm high, base of the rib up to 18 mm wide, only slightly raised above the areole. Areoles at the crown very woolly so that on older plants a white cap forms, up to 60 mm in diameter, areoles up to 6 mm dia., up to 10 mm apart. Spines much stronger than in *N. schumannianus* and therefore less brittle, in the woolly top brown with darker tip, otherwise usually grey-white, sometimes variable in dark silver to yellow, all with darker tip, 3-4 and no distinction between radials and centrals. Sometimes, especially in younger plants, a few small auxiliary spines appear. When there are 4 spines present, these are in the form of a cross, varying and changeable in length, the two side spines 25 - 40 mm long, the lower to 60 mm long, the upper if present short, up to 20 mm long. In older plants the upper spine only appears sporadically. All are shorter at the top of the plant.

Buds lengthy, with light grey wool and dark brown bristly hairs.

Flower 65 mm long closed, up to 70 mm wide, yellow. Pericarpellum hollow 5 mm long 4 mm diameter; outside covered with white wool and a few dark brown bristles. Above the pericarpellum the receptaculum expands solidly for 6 mm, whereafter comes the wall of the receptaculum which is 20 mm long to the upper edge and 3 mm thick. Receptaculum funnel shaped, at the edge 18 mm (in diam. presumably - H.M.); nectar chamber not or scarcely present. Stamens from the base of the receptaculum, not coming to a point due to the receptaculum enlarging, regularly inserted from quite close to the pistil to the upper edge; primary stamens up to 18 mm long round the base of the pistil and leaning against it in a bundle. The others up to the rim up to 6 mm long, weak, pale yellow; anthers of the primary stamens stand as a bundle round the pistil, the rest leaning towards the pistil, all yellow.

Pistil without stigma 25 mm long, 1 mm thick, the 7 stigma lobes slender and pointed, spread out, up to 7 mm long, yellow and about 2 mm above the highest anthers. Petals yellow, spatulate, 27 - 30 mm long, 2 mm wide below, above 8 - 9 mm wide at the widest.

Fruit shiny brown, round, about 15 mm diameter, fairly heavily covered with white silky hairs and only at the base an odd red-brown bristle, drying up and splitting round the base from where the dry seeds fall out. The dried up flower remains stay adhering to the fruit.

Seed small, ca. 0.8 - 0.9 x 0.6 - 0.7 mm, bonnet-shaped, testa chestnut brown, shiny; the testa is almost flat, on account of the humps on the seedcoat being very flat; the hilum is ochre-yellow in colour, wider than the seed, from which arises a projecting brim; the micropyle lies in the swelling of the hilum; the funicular opening is usually not perceptible on account of the spongy tissue covering the hilum; the testa wall is not covered with any film.

Comments on *Notocactus nigrispinus* & *schumannianus*

..... from H.Middleditch

"During our 1969 Cactus Tour we paid a call on Uhlig's nursery at Stuttgart. Among the plants on the staging was a batch of about two dozen specimens which caught my eye - they gave the impression of being an *Eriocactus*-like plant but were a form with which I was not familiar. A brief search between the plants yielded a label bearing the legend *Eriocactus schumannianus* var *nigrispinus*; my initial reaction to this was that there must have been a mix-up with the labels, since these plants bore precious little resemblance to what I considered to be *schumannianus*. However, I was assured that the name was indeed no mistake, so I selected one plant for purchase.

"On returning home I made a search through various books in order to find out something about this new acquisition, but other than a brief reference in Britton and Rose, the available literature was of no help. I was, therefore, delighted to find this article by Buining in *Succulenta*, which gave a very comprehensive account of this plant.

"My acquisition was about 100 mm high and some 60 mm in diameter, all but the very top being quite brown and corky, just like the rest of the plants available. I did wonder at first whether this could be due to the growth of lichen around the body in habitat, rather like the *Uebelmannia* illustrated on p.87 of the Dec. 1967 N.C. & S.S. Journal, but on reading Buining's article I now presume that it is very probably due to the accumulation of grasses and ground-hugging growths round the base of the plant in habitat. The top of my plant is now growing quite nicely with a fairly deep green epidermis. The centre of the crown is quite woolly now, for about 25 mm across. Outside this woolly centre there is a deposit of loose wool at the bottom of the grooves between the ribs, almost out as far as the shoulder. The slightest puff, however, will disperse this loose wool and I suppose that this tells me that it is far too long since I sprayed my plants. This deposit of loose wool is rather similar to that which appears on some *Parodias* and in both cases it seems to be more in evidence on cultivated plants than on imported specimens.

"The newer spines in the centre of my plant are a deep chestnut brown but those out towards the shoulder are banded light brown and pale yellowish-brown in a most irregular patchwork; perhaps when Buining refers to the spine colour being variable he did mean that it varied not only over one plant but also along one spine, rather than meaning that different plants were found with different spine colours. The lowermost spine is indeed the longest, about 30 mm long and has a slight twist either upwards, downwards, or sideways, or even into a slight S shape. There is no reference to this feature as a characteristic of the central spines in Buining's description, but it also appears - to a less obvious extent as the spines are shorter - on my small specimen of *schumannianus*. The auxiliary spines referred to by Buining are appearing at some areoles and in some cases they have grown slightly longer than the short, upper, centrals.

"During a Chileans get-together in the North-east of England in September 1970 a flower of *Notocactus leninghausii* was sectioned. This appeared to have a small number of primary stamens inserted near the base of the pistil, which were rather taller than the remainder of the stamens which were inserted over the full depth of the receptacle wall. There was no tendency for these stamens to lean inwards when touched, but had they done so the stamen pattern would have been remarkably

similar to that depicted by Buining in his flower cross sections for *schumannianus* and *nigrispinus*".

..... from K.Halstead

"This is indeed an interesting article by A.F.H.Buining. Three years ago I imported from Uhlig a small *N.schumannianus* v. *nigrispinus* which was columnar and had long dark silvery spines, no doubt one of the batch to which H.Middleditch refers. Unfortunately it was somewhat dehydrated and failed to root with the consequence that it passed out of existence.

"The differences, according to Buining's information, are quite marked and *nigrispinus* would seem to rate as a separate species with regard to flower, seed, and location not to mention plastic features. I must point out that there are several plants on the market under the name of *Notocactus nigrispinus* that have nothing whatsoever to do with the *Eriocactus* group and do in fact belong to the *mammulosus* complex.

"I have always considered *N.grossei* and *schumannianus* synonymous and it is refreshing to receive valuable confirmation direct from habitat. It shows up the flaws of previous authors who based their information on single or immature plants which makes it now so necessary to revise some descriptions. To quote Backeberg's own words on *N.grossei* shows a classic example of such lack of information - "the ever cautious Schumann gave the number of ribs on a very young *grossei* as 16". This error seems to have been perpetuated by Britton and Rose and Berger, who obviously failed to do their field work. After all, Britton and Rose in their 'Cactaceae' admitted that *grossei* was only known to them from illustrations and descriptions.

"Even with *N.schumannianus* descriptions are variable in the Chileans alone. In Vol I No.5 (article by Dr.Simo) the spines were described as 4 - 7 (centrals 0-1), and ribs up to 30. The latest description by A.F.H.Buining shows centrals sometimes 4 and ribs 45 or more. Is this another example of the true facts at last coming to light?

We have a slide of *N.schumannianus* in flower - A.W.C.

CACTI ON ORE MOUNTAINS AND IN RED EARTH by P.Lorenzo J.Hammerschmid.

(Translated by E.W.Bentley from K.u.a.S. 13.8: 1962)

For ten years a German firm in La Paz besought me to investigate a medicinal plant in our mission district in east Bolivia, that was of interest to pharmaceutical manufacturers. I had never heard of the plant's name and had searched in a botanical reference work in the University Library, which did not, however, give it; but the librarian, a friend of our missionary, said to me "The only person who can give you the information is Dr.Martin Cardenas in Cochabamba".

So I visited the most famous of Bolivian botanists and from the first conversation we became friends. Through him I became aware of a whole lot of botanical rarities, treasures, and secrets sheltering in forests and pampas. Above all, he directed my interest to cacti and stimulated me to investigate these spiny growths in our mission district, for at the time the Province of Velasco was unknown to him. It is true that he had been in the Province Chiquitos during the Chaco war, but the urgent defence of the boundaries of the fatherland left no time then for botanical studies. Later Dr.Cardenas made only a short study trip along the railway line Corumba - Santa Cruz, where he discovered *Frailea chiquitana* and *Bolivicereus saimapatanus* v. *divi-miseratus* in Santiago on the Sierra San Misera.

Quite soon I was able to send the cactus specialists a collection of cacti from the Province of Velasco: *Cereus daymanii*, *Monvillea cavendishii*, *Harrisia pomanensis*, *Mediocactus coccineus* with orange yellow fruits, *Opuntia brasiliensis*, *Epiphyllum phyllanthus* with yellowish white flowers, *Rhipsalis shaferi* and *Pereskia sadiarosa*. The solitary globular cactus that I was able to find in the near and far surroundings up to 250 Km was, according to Dr.Cardenas, a new species

and he gave it the name *Echinopsis hammerschmidii* Card. (described in the *Am. Cac. and Succ. Jnl*, 1956).

Years passed and I carried out studies for, and partly with, Dr. Cardenas on Annonaceae, Dioscoraceae, Amaryllidaceae, and Apocynaceae in so far as these families were represented in Velasco. For the first time, in the summer of 1961/62 from November to January, I was able to study cacti in the Province of Chiquitos in the southern part of our mission area. The departure point was Puerto Suarez on the Brazilian border, the hottest place in east Bolivia and of the Department of Santa Cruz, on the Laguna Mandiove, opposite Corumba, the "Cidade branca" of the Matto Grosso. The chalk moraine on which the settlement lies resembles a baking oven, which stores up the sun's heat and then re-radiates it until far into the night. On this ground twines *Opuntia canina* with yellow flowers and garish red fruits; forming a grove of succulents stands *Cereus dayamii* like chandeliers and at the foot of the Quebrados, here called 'cudii', coil three species of the snake-cacti, namely *Harrisia pomanensis*, *Monvillea cavendishii* and another *Monvillea* which looks very much like a *Cleistocactus* but which has not yet been more closely identified by Dr. Cardenas.

In the felspar of San Cyrilo, some 10 Km distant from base, I happened on a spherical cactus; somewhat flattened, the largest specimens up to 200 mm in diameter, the ribs stepped into tubercles, in the crown a woollen flower cushion with withered flowers and dried up fruits, from which fairly large black seeds fell. According to Dr. Cardenas, it is a species near *Malacocarpus macrocanthus*. The snow-white flower of which the outer perianth leaves are tinted brick-pink, is some 50 mm long and much slimmer than in Fig. 1553 in Backeberg's *Die Cactaceae*. (The plant is clearly one of the almost lost genus *Discocactus*. Perhaps *D. heptacanthus* or *D. alteolus*, which are described from the Brazilian Matto Grosso. - G. Frank, Vienna).

An Indian said to me: "That is a plant that flowers only for God: you will not enjoy its scented flower by day". And rightly so! The heat forces the buds comparatively quickly from the wool cushion: one can observe the progressive growth at different hours of the day. But the delicate flower opens slowly only after sunset and unfolds to its full extent in the night. Its fine fragrance lures countless moths to pollination and by the next morning the flower is faded. After some weeks a green-white fruit, scarcely 20 mm high, with sweet flesh and about 15 comparatively large black seeds, emerges from the woolly crown.

The Indian of San Cyrilo mentioned also that there were Brazilians hereabouts and they gathered these cacti in order to make preserves, and clearly not from the fruit, but from the green plant. Then I was able to understand why some women in Pto. Suarez called this cactus "Pinita" - small pineapple.

The Indian who spoke to me at San Cyrilo knew however of yet another place with spherical cacti, namely Mutun iron ore mountain where this year the German Bergbau-Unternehmen-Sulzgitte were beginning to work iron and manganese. It was not easy to get there, but one of my former pupils, now Commandant of the military fort in Mutun, provided me with a jeep and we drove from the light forest into the rain-green damp woods of the red earth until, after 25 Km, we finally came to the ruined barracks of an English mining company that had tried its luck here in previous years.

The ground here is a single stony spoil heap of haemetite and limonite. Below, in the plain, the Indians have made fine fields and banana plantations from the red earth. The district is rich in rainfall, for the iron attracts the thunderstorms, though in Pto. Suarez no rain falls for a month at a time. In Mutun one sees fine waterfalls and the clear streamlets with fresh water refresh heart and throat. Besides *Cereus dayamii* flowers *Peireskia sacharosa*. Till now I had know the latter only as a small shrub, but here it was an imposing tree, the fearful spines of which forbade every approach. The Bolivian military here has some horses and mules, so that one can ride the 7 Km up to the high plain of La Cruz, from out of which the first excavations in the ore-mountain were projected.

The name of the place stems from a cross-shaped gully in a rock plateau of Riabe (breccia consisting of quartz and manganese-bearing limonite). Indians have built up there a rude hut from

palm leaves and on the 3rd May celebrate the feast of the cross with great pomp. The whole high plateau, of some 50 x 200 m, is composed partly of pebbles and partly of Riabe blocks and exhibits only a thin vegetation. Of interest to me particularly are a pair of fine flowering mallows, some bromeliads of the genus *Dyckia*, Portulacaceae and also groups of *Discocactus*, somewhat smaller than those of San Cyrilo - where they stand on chalk soil - strongly tubercled and thickly spined.

Lloyd Aereo Boliviano brought me in two hours to San Jose de Chiquitos. Fifty years ago our mission pioneers had to make the journey by horse or riding-oxen over three weeks, but here today there are planes, and on the railways fast rail-cars also. This provincial capital lies at the foot of one of the many sandstone mountain ridges that traverse the Province of Chiquitos. Here 400 years ago the great Conquistador Nuflo de Chavez founded the city of Santa Cruz de la Sierra, and here in the vicinity, 200 years ago, the great Swiss missionary P. Martin Schmid, S.J., had built the first vocational schools among the Indians and so brought civilization to the children of the forest. On the hard loamy soil and also in the sandy hollows, *Opuntia canina* and *Opuntia kiska-loro* flower freely. In the light brushwood grow *Monvillea* and *Harrisia*.

The wild Ayare Indians knew our mission and one day brought me a pair of disc cacti whose ribs made a wonderful star, regularly humped, with mostly 8 ribs. On each hump is a small areole of about 1 mm diameter from which project 5 soft, curved spines and which in old plants reach a length of up to 30 mm. The flower bud is pink with olive-green middle stripes on the perianth leaves. The open flower is white tinged with pink; the numerous stamens bear grey anthers. The light green flower tube bears small scales, half-moon shaped, with a white edge and pink tip. Also the perianth leaves have a pink stripe on the outside. The ripe fruit becomes a red amphora, 30 mm long with dark carmine-red flesh and light-brown seeds.

Dr. Cardenas identified the species later as *Gymnocalycium damsii*. The next day I searched for the locality and found the plants on the way to our jungle settlement, only half an hour beyond the site. It is an erosion area, where the heavy rainfall makes deep gullies through the meadow-like bush. Hidden under bromeliads and near *Monvillea*, these *Gymnocalycium* shine like wind-flowers in the sandy earth.

A decrepit jeep without brakes and with bad steering carried me some days later to the ruins of Alt-Santa Cruz along the mountain chain in the south of San Jose. For half an hour we ascended the sandstone rocks till we came to the high plateau, from where we obtained a wonderful view over the Palmares as far as the distant caoutchouc forests in the north. There accompanied me two teachers from the College of San Jose who soon drew my attention to an *Echinopsis* of some 250 mm in diameter. It was an old *Echinopsis calochlora* surrounded by various other small ones.

Near these another species of globular cactus revealed itself, which partly hid in the grass but mainly had cheerfully dug itself into the pebbles of the red iron-bearing conglomerate. So one saw virtually only the flat crown, which can reach a diameter of 150 mm. The blunt tubercles almost recall *Discocactus* but it lacks the wool cushion in the crown. The areoles send out 8 curved, hard spines of which the central stands upright, the others place somewhat obliquely forming a heptagon. The flower possesses a long tube of an almost dark blue colour, the flower itself is a beautiful deep pink to carmine. The fruit becomes black-blue on ripening and contains many black seeds in the red fruit flesh. Dr. Cardenas informed me that it is an unknown *Gymnocalycium*. Herr Karlheinz Uhlig, whom I take this opportunity to thank for supporting my expedition, has perhaps in the meantime brought some of these cacti into flower in Germany also.

I had to spend Xmas in the *Frailea chiquitana* area i.e. in Robore and Santiago de Chiquitos: I had already found the dainty cactus on the high ground in the south of San Jose. Here Dr. Cardenas had also discovered and described it for the first time in 1949. Beyond Robore and towards the north on the road to the Kalvarienberg I found it in the pebbles that fill the hollows and crevices of the sandstone and haematite rocks, partly buried with long tap-roots and partly free-standing with only a few roots anchored in the crevices. Here the *Fraileas* are frequently overgrown by

delicate Lycopodiums and hairy red-flowering Mesembrythemums and are hidden under them. Other accompanying plants were bromeliads (*Dyckia*), *Echinopsis calochlora*, the beautiful finely-haired candles of *Bolivicereus samaipatanus* v. *divi-miseratus* and *Monvillea cavendishii*.

In the mountain world of Santiago I made several expeditions for it is truly a botanical paradise as Dr. Cardenas once said to me. At this time, in the jungle flowered the Tayoi, a *Vochysia*, that surrounded the village with a beautiful yellow garland. The district resembles our Alps, with waterfalls and beautiful alpine meadows; but the poisonous Apocynaceae and Asclepidaceae allows no cattle-raising. In the sandstone rocks flowered also a number of different orchids and on the San Miserato, one of the highest mountains of the vicinity, stood in fine groups a *Barbacenia* that stands near *Amaryllis*. Dr. Cardenas had found *Frailea chiquitana* for the first time there and also the variety of *Bolivicereus samaipatanus*.

In the neighbourhood of the village in a sunny area of rocks I found once again *Frailea chiquitana*, but differing from the species from Robore, without the white hair-felt in the areoles and with dark brown spines. Dr. Cardenas opined that it was a case of old plants, but the young, quite small ones also already showed the same character. The flower is likewise light yellow.

On the home journey to Robore I found also *Cleistocactus baumannii* and the familiar *Monvillea* that I had seen in previous places. But suddenly I called to the jeep driver "Stop, there's something new there!" From the bush shone out a rather thinner, bluish-green snake-cactus that I had never seen before. With the knife I cut myself a way through and soon stood before such a cactus-salad as I had never seen before: *Harrisia guelichii*, *Mediocactus coccineus*, both in fine flower, *Monvillea cavendishii* and between them yet another *Monvillea*, 4-cornered and slender, of 20 - 30 mm in diameter, with violet flower buds, the open flower snow-white with lilac rays. As Dr. Cardenas later explained, it is *Monvillea haageana*. In that thicket spiny snakes grow along with *Gymnocalyciums* like those of San Jose, but somewhat rounder and less sharply stellate; also the ribs are less strongly humped, rather more rounded and flat. The flowers are whitish-pink tinted with dark grey anthers on the filaments. The plant flowers already at 25 mm diameter and can reach up to 90 mm diameter. It is doubtless a habitat form of *Gymnocalycium damsii*.

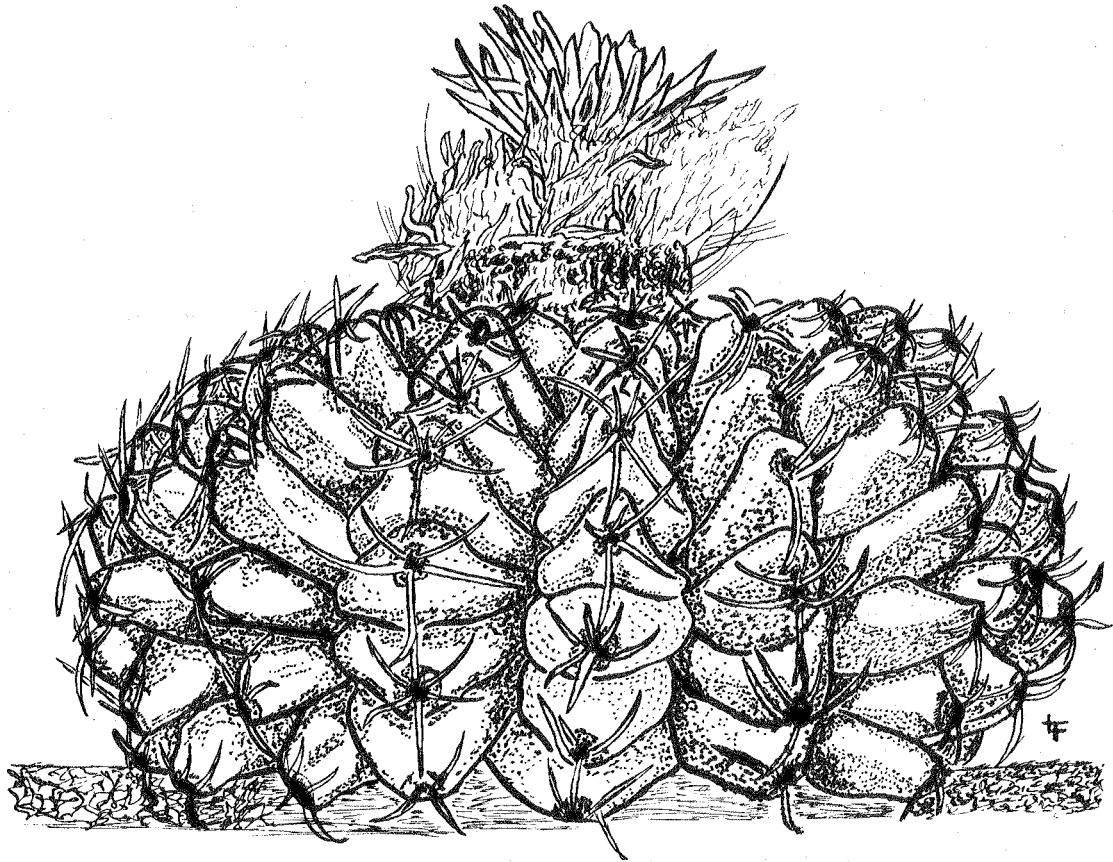
With this the holiday excursions into the iron-ore mountains and on the red earth of Chiquitos found their end for this year. I had to go back again to school. Still, in an area 300 Km long by 50 Km wide I had been able to make a couple of random samplings that indicated what among the cacti still lies hidden here.

DISCOCACTUS HU 193 FLOWERS by T. Lavender

The plant shown in the accompanying sketch was purchased from Sutton-under-Whitstonecliff nursery in August 1970. Like all plants which come newly into my collection, I unpotted it on reaching home in order to check the condition of the roots. However, I found that the plant was already well rooted so I did not disturb the soil but replaced the plant in its pot. It appeared to be growing in a rather gritty soil-less compost.

This plant is kept, along with other less hardy specimens, in a propagator stood on the staging and heated by a bottom soil-warming cable. The thermostat is set so that the propagator never drops below 60°F.

I think that provided the plant is kept warm it will take quite a lot of water. I soaked the plant in question from the base and probably left it a little too long in soak; the results were a split epidermis which exuded a light brown resinous sap but did not do any severe damage to the plant. This resin is now quite solid and hard. From conversations with other cactophiles I find that the splitting of the epidermis and bleeding is not uncommon. Now the plant is watered from above on to the soil rather than by soaking the pot in a bucket.



DISCOCACTUS HU 193. Collection— T. Lavender.

Plant and Flower Full Size. Fruit x 2.

About one month after purchasing the plant a series of flowers appeared - about eleven in all. On those occasions the flower stood fairly well above the cephalium, with much more of the tube and lower petals visible than could be seen on the flowers borne this season. Some of the lower petals could be seen part-way up the tube, just like some illustrations I have seen in continental cactus journals. The four flowers which appeared during June and July of 1971 were much shorter, as depicted on the accompanying sketch. The flower was a little ragged with the flower petals not regularly disposed when looking down into the flower.

The first signs of a bud appeared this year about 16.30 hrs on May 26th and when first seen the bud was protruding some 3/8" from the densely woolly cephalium. The flower was fully open at 20.00 hrs the same day, as flat as a plate, with a delightful acid lemon perfume. The following is a description of the flower as far as I could observe it without pulling away the woolly cephalium:

Flower 1 $\frac{3}{4}$ " in diameter, outer petals blunt at the tip, greenish brown. Petals in three rows, inner two rows acuminate, all petals with the satiny texture common to cacti. The stamens, both filament and style, were creamy yellow in colour. The stigma lobes were also cream but the style was not visible as the stigma and style were deep inside the flower.

The flower was still wide open at 06.30 hrs the next day, was half closed at 08.30 hrs and fully closed at midday. The flower did not set fruit but a sketch of a partially dried fruit that formed from an earlier flower is included. When turgid, the fruit was a creamy colour but sufficiently transparent for the seeds to be visible within when the fruit was held up to the light.

Comments on *Discocactus* in flower.

..... from H.Middleditch

"On our 1971 Cactus Tour we were fortunate enough to find a *Discocactus tricornis* in flower at the Zurich City collection. From a previous account (*Chileans* No.9 p.6) we would have expected the flower to be sadly withered before mid-morning and it was quite a surprise to see it in apparently quite good condition at that time. Perhaps the rather overcast sky may have accounted for the longevity of the flower."

..... from A.W.Craig.

"In 1970 I obtained six different species of imported *Discocactus* from Su-ka-flor. These plants were placed in a separate section of the greenhouse which is kept at a thermostat setting of 55°F. They became fairly well established and both HU 198 and HU 325 flowered in the autumn of that year. No fruits were seen on either plant but later the following year I discovered in the cephalium of HU 325 a dried up fruit which had not been there when I examined the cephalium carefully on receipt of the plant. This seed was sown in September 1971 and about 11 seedlings germinated in the course of about 10 days.

"One of my six plants succumbed during the winter of 1970/71 and a second plant followed in spring 1971. This plant appeared, on examination, to have rotted down from the cephalium, for the root system was still quite healthy. Perhaps this could have been due to some degree to my generous overhead waterings with a hose, so from then onwards I was somewhat less generous with the overhead water.

"In the late summer of 1971 I commenced to water these plants with a weak solution of nitric acid and shortly after I placed them on bottom heat. This was rapidly followed by a most marked improvement in the condition of the four plants; the body colour became greener rather than an indeterminate khaki or bottle green, the plant visibly expanded and it became possible to see for the first time the very fine dust which had been right in the bottom of the grooves between the ribs. All four plants then flowered and shortly afterwards they were repotted, each pot being found to contain a well-developed root system. The roots appeared to have grown out sideways from the plant, as far as the edge of the pot, and then turned to grow downwards. This would appear to

confirm the comment by G. Esser that the roots of these plants grow sideways, rather than downwards, for preference.

"The cephalium on HU 325 was about 35 mm in diameter and contained dense white wool just over 30 mm high. Two or three dozen bright red bristles grew in the cephalium and overtopped the wool. There were one or two dirty patches on the exterior of the cephalium, close to the body and on making a close examination of these in September 1971 they proved to be old flower remains very withered and brittle. One of these had evidently set fruit in habitat and yielded 58 seeds - this despite my having made a thorough search inside the cephalium wool on receipt of the plant for any seeds."

..... from Clive Innes

"The description of HU 193 and flower agree with my observations except that we have found that usually several flowers are borne at the same time, rather than a series of individual ones as mentioned. Our flowers have not been as fully expanded, possibly due to being in shady conditions.

"The flower shape seems to vary considerably between species of *Discocactus*. We are growing them in Arthur Bowers compost, in well crocked pots and give them plenty of water, with a minimum of 60°F."

A GLOBULAR CACTUS IN HABITAT AND IN CULTIVATION - WHAT WE KNOW ABOUT DISCOCACTUS HARTMANNII (K.SCH.) BR. ET R. by Gerd Esser.

(Translated by K. Wood-Allum from K.u.a.S. 21.1:1970)

Two South American globular genera, in the course of their development, have evolved the characteristic of a terminal flower formation in the form of the so-called crown cephalium. The two genera are, of course, *Melocactus* and *Discocactus*. Whilst *Melocactus* is frequently met with in collections, one seldom encounters *Discocactus* in cultivation. Relatively little is known about the ecological conditions which led to their evolution. Amateurs are therefore hardly aware of their cultural needs.

It is my intention to publish in this article the little I learnt about *Discocactus hartmannii* from my own research during my year's study tour in Paraguay.

First we shall consider the geological factors in the habitat of *D. hartmannii*. It is essential to bear in mind the geographical, climatic and geological conditions in Paraguay. The country lies almost in the middle of the South American continent between latitudes 19° and 27° south. It is about 900 km to the two oceans but protected from the Pacific by the Andes which rise to over 5000 m. To the north and south however, to the antarctic and the tropics, it is open. Paraguay is divided by the river of the same name into two different landscapes:- The Chaco Boreal, the northernmost section of the Gran Chaco in the west and in the east the Paraguayan terraces which are the geological and geographical continuation of those of the Brazilian mountain area to the west.

Climatically Paraguay belongs to the subtropical transitional area. Its great distance from the sea gives it a continental climate. While the average yearly temperature is 24°C., the temperature extremes range from -4°C. to 45°C. Since it is the Atlantic which produces the precipitation there is a linear decrease from East (1800mm) to West (500 mm at Canado Oruro). The main precipitation is in the southern summer. A frequent change between hot dry tropical air from the Amazon region and moist polar air from the south is the rule. This is always accompanied by violent thunderstorms which rage freely in the southern summer, especially in Eastern Paraguay. The fall in temperature caused by the change of air is mostly complete within a few hours. On average this would be from 36°C - 40°C. down to 15°C - 20°C. in summer and from 25°C - 30°C.

down to 5°C to 10°C. in winter. It is the northern part of Paraguay which interests us since the habitat of *D.hartmannii* is to be found in that area. Northeast Paraguay is best described as tropical. The climate there is more balanced than in the rest of the country and the existence of *Discocactus* as well as *Pilosocereus*, both genera of tropical distribution, indicates this.

The geological structure of North East Paraguay is determined by an ice-age layer following on from the Carboniferous period - the so-called Tubarao series. For us the most interesting aspect is the interglacial red sandstone in many areas which is very soft and weathers down to form a brick red to brown clay. The sand content varies. Tropical rain forest thrives in its finest form on this clay as well as subtropical rain forest. If the sand content is high the rain forest is replaced by low growing afforestation some 10m high, dominated by small leaved trees with thick bark. An even greater sand content leads finally to the vegetation of the loose drifting sand layers which form natural treeless areas in the middle of the rain forest which can vary from a few hectares to several square kilometers. The precipitation is no different from that of the rain forest. Despite this the vegetation of the sand flats has adapted itself to the dry habitat. Rainwater drains away rapidly and at night there is extremely heavy dew. The plants of the sand flats have developed in such a way that they can absorb nocturnal dew and store moisture. Long, spreading, shallow roots and large underground stems are a common feature. Tufts of grass cover the ground, leaving occasional large bare areas.

Discocactus hartmannii occurs over a wide area in the sand flats. Even though it will frequently be necessary to search for hours for a single specimen, I never failed to find one on the sand flats I visited which are quite often separated from each other by many kilometers of forest. Although the individual habitat localities are only small, the total area in which *D.hartmannii* occurs is at least 400 by 150 km, corresponding to the area of the Tubarao formation.

To suit its environment, *D.hartmannii* has developed a root system which extends horizontally 5 - 10 cm below the surface and which can, in a mature plant, cover an area of 10 square metres. Unlike many deep rooting cacti, *Discocactus* does not take up underground water but surface rain-water and dew. Since dry periods of a week to a fortnight are not rare in Paraguay in summer, the plants have been forced to adapt to take up the heavy dews caused by the clear skies. Favoured by the high humidity of the forest areas, the dew alone would suffice to provide *Discocactus* with all the water it needs since sometimes in the areas near the forests the night temperature falls more than in the savanna. In any case, after a clear night, at the depths where *Discocactus* spreads its roots, the sand is very moist and seems not to dry out completely by the next evening. We may assume therefore that *Discocactus* in habitat has no problems of water supply.

By far the greater problem is its mineral salt supply. It can be assumed that the frequent rainfall leaches all the soluble constituents of the loose sand and deposits them at great depths. Soil analyses have revealed only very small traces of the main plant foods (N,P,K.) In addition there is almost a complete absence of the various trace elements such as Cobalt and Copper. The pH on the surface was 4.5 and at 10 cm. below the surface 4.0. *Discocactus* however covers a wide area with its root system and can therefore take up whatever minerals are available. It also seems probable that at certain times of the year the nutritional content of the sandy soils is considerably higher, for example when leaves fall from the plants of the forest and sand flats, ultimately to decompose. In cultivation *Discocactus* is not sensitive to variations in mineral salts. So far as the other factors are concerned, namely the provision of light and damp fresh air, we have no need to get too involved since in habitat they are optimal.

Discocactus in Cultivation

Having examined in minutest detail the natural conditions in which *Discocactus* flourishes we can see that successful cultivation in collections presents no difficulties. I have successfully grown collected plants in the University of Heidelberg Botanical Gardens. The plants, transported by sea and air, were first planted and cared for like the other cacti in bowls in the succulent house. The root system developed quickly and would have reached the normal proportions found in the wild, had it not been for the limitation of the bowls. They are watered with rainwater whenever the

surface compost is dry by means of a hose over the crown of the plants. We are sure that *Discocactus* is easy to grow if you have a warm, moist greenhouse. The imported plants at Heidelberg produce groups of between 3 and 10 flowers per plant every four to five weeks during the summer. We already have seedlings raised from our own seed.

Short Description of *Discocactus hartmannii*

Depending upon the place of origin, *Discocactus hartmannii* are either solitary or form groups of from three to ten heads although they clump less frequently in the wild. In cultivation they are, like *Echinopsis*, keen to pup. Young plants are spherical, older specimens more flattened to conical with a crown cephalium, which can grow quite high. Adult plants can reach 20 cm in diameter and 8 cm high, excluding the cephalium. Younger plants have 20 - 30 wavy ribs which develop into tubercles in flowering size plants very similar to those of *Mammillaria*. Each tubercle is ca. 20 mm high and 8 - 10 mm wide. Nearer to the cephalium the tubercles get smaller, only 1 - 2 mm high and 4 mm wide. The rib count on cuttings remains constant but the diameter of the plant body in the area of the cephalium has a markedly reduced diameter of 4 - 6 cm.

As with *Melocactus*, *Discocactus* ceased to grow at the crown when it is of flowering size. The cephalium slowly gets higher. The vegetative as well as the reproductive parts of the plant grow for the life of the plant laterally in a rather weak and secondary way. That is why old specimens spread their tubercles, while in young plants they are close together. The areoles of the vegetative portion of the plant body have 6 - 7 horn-like strong spines of a yellow to reddish brown colour. The spines reach 20 - 25 mm in length. The areoles close to the flowering point have close lying 4 cm long woolly hairs as well as 6 - 7 ca. 5 cm long white to red brown bristles which look like the spines of the vegetative areoles.

The Flowers develop only from the reproductive areoles, i.e. from the tip of the cephalium tubercles. Numerous buds are formed simultaneously and sequentially. The period of development is very brief. As soon as the 3 - 4 cm long bud emerges from the cephalium only 15 - 20 hours elapse before the flower opens. During this time they double in length. The flowers are nocturnal and open for only a few hours. They are white, strongly scented and completely hairless. They are 6 - 8 cm long with a pericarp of 9 - 10 mm and a nectary of 30 mm. The pistil is as long as the flower tube. The five stigma lobes are connected.

The anthers are small, the filaments are only 2 - 3 mm long. The pinkish fruit is similar to that of *Melocactus*, a hollow berry about 40 mm long and 8 mm in diameter.

Discocactus inhabits a large area but the actual locations are very small and limited to treeless areas in the rain forest. These sand flats, or lomas, are the only areas in the forest on which the Paraguayans can raise their cattle. Since feed is poor, the cattle owners attempt to renew the grass by regular burning off. The *Discocactus* bear severe scars as a result.

This is a gloomy situation. *Discocactus* could be extinct in its habitat within ten to twenty years.

Comments on *Discocactus*

..... from H.Middleditch

"The comprehensive article by Gerd Esser was accompanied by several illustrations, two of which depicted *Discocactus* in habitat. One of these showed some plants which were amongst recently burnt vegetation. Most of the spines and areoles had been burnt off the plants so producing an appearance to some degree reminiscent of the illustration of "*Discocactus subnudus*" depicted in Fig 228 in Vol.III of Britton and Rose. The habit of burning off the dried-up vegetation has long been prevalent in Eastern Brazil, which may thus account for the otherwise inexplicable appearance of the so-called *D.subnudus*."

..... from Mrs L. Teare

"My correspondent in Brazil gave me quite a lot of information on the Mato Grosso. He grows orchids which he was collecting in the tropical forest, but coming away from the forest he gave me this description of the area he visited north of the Paraguayan border:- 'Coming out of the forest in a northerly direction, the landscape is entirely different; flat fields stretching away towards the horizon. The vast barren plain is cut, in the foreground, by the Hu Iguatemi, a snaky, treacherous river of muddy and swift flowing waters. After crossing the bridge and climbing the left bank, one sees the first colonies of *Discocactus alteolus* half-buried in the sandy clay soil and only revealed by their sharp pink fruit. As the droughts in this area are very severe, the native plants have a highly developed rooting system, both in breadth and in depth, which makes them very difficult to dig out. Occasionally you can see splendid isolated specimens of *Cereus jamacaru*; I did not find any succulents but rather some xerophytic plants with extremely interesting shaped flowers."

..... further from H. Middleditch

"Now I wonder if the buried bodies referred to by Mrs Teare's correspondent would be similar to the 'large underground stems' described by G. Esser, for this phrase rather puzzled me. None of the Muscosemineae group of *Gymnocalycium* or the *Echinopsis* which emanate from the Chaco exhibit swollen underground stems of the type which we associate with some *Copiapoa*, *Neoporteriana*, *Pygmaecereus* or *Neowerdermannia*. Some of the *Frailea* have thickened main root stocks similar to some *Sulcorebutia*, but this would hardly merit the description "large underground stems."

"In his Lexikon, Backeberg gives Rio Capivary as the habitat for this plant; this has not yet been located on a map. G. Esser gives the habitat as the north-east of Paraguay - however, as the border runs from NW to SE, one has a fair amount of choice in placing the 'north-east'. Since the reference to the red earth and the character of the forest is rather similar to the description given by Hammerschmid, one might suppose that the 'north-east' is that part of Paraguay adjacent to Bolivia and about fifty miles from Puerto Suarez.

SULCOREBUTIA MIZQUENSIS Rausch sp. nov. by Walter Rausch

(Translated from K.u.a.S. 21.6: 1970 by E.W. Bentley)

Simplex ad proliferans, ca. 25 mm alta et 30 mm diametens, radice rapiforme; costis ad 17, spiralter in gibberes 4-5 mm longos, in inferiore parte rubro-violaceo-coloratos dissolutis; areolis 4 mm longis et 1 mm latis, albo-tomentosis; aculeis marginalibus ad 20, ad 4 mm longis, dense corpori appositis, albo-acuminatis, media parte roseis, basi nigra incrassata; aculeo centrali nullo. Floribus ca. 30 mm longis et 25 mm diametentibus, albo- ad atro- magentis, saepe fauce alba.

Habitat: Bolivia near Mizque at 2,600 m.

Type: Rausch 194 in Herbarium of Natural History Museum Vienna.

Single to offsetting, ca. 25 mm tall and 30 mm diameter. With tap-root; ribs up to 17, set spirally in 4-5 mm humps, that are coloured red-violet on the lower half; areoles 4 mm long and 1 mm broad, white felted; radiating spines up to 20, up to 4 mm long, close to the body; tip white, pink in the middle and with a black, thickened foot; no central spine; flower about 30 mm long and 25 mm dia., light to dark magenta, often with a white throat.

This form belongs to the *Sulcorebutia verticillacantha* Ritter group from which it differs through the thicker spination, which reminds one of *Sulcorebutia kruegeri* (Card) Ritter, but it has violet pink flowers.

(Translator's note: From the Latin it sounds as if the ribs are coloured red-violet on the lower half. The German text sounds somewhat as though the reference is to the lower half of the humps being so coloured.)

SULCOREBUTIA MIZQUENSIS Rausch by Walter Rausch

(Translated from Succulenta 50.7: 1971 by H.Middleditch)

In many of the localities where *Sulcorebutia* grow one may find a plant of which it is not possible to say straight away whether it is a species already known or whether something new is growing here. Thus we found in 1965 (my companion then was Ing. Markus) by Mizque in Bolivia upon a mountain a small *Sulcorebutia* which we could not say at once whether it was *Sulcorebutia verticillacantha*, *taratensis*, *sucrensisi*, or some other valid species.

In the intervening years of cultivation together with the other named species, all under similar conditions, these plants from Mizque have preserved their own typical character; so that there was every justification for describing this species as *Sulcorebutia misquensis* in *Kakteen und andere Sukkulente* 1970. It is distinguishable from the other known species on account of its peculiar spination, which is formed like a roof with tiles locked together closely adpressed against the plant, usually pointed downwards.

We wished to collect more specimens on the neighbouring mountains, but found no more there, so that the habitat remains limited to only one single mountain. It grows there together with *Lobivia pojoensis* v. *grandiflora* and *Parodia hausteiniana*, whose habitat is also limited to this one small mountainside.

Sulcorebutia misquensis will not become collected again easily on account of its very restricted growing area and above all because of its very small dimensions it is hard to find. But grafted it happily produces offsets without difficulty so that this small plant with its peculiar habit is a very precious jewel in our collections.

Comments on *Sulcorebutia mizquensis*

..... from H.Middleditch

"One might be tempted to suggest that we have made two misprints in the translated article from *Succulenta*, in referring to *Sulcorebutia* "misquensis" instead of mizquensis. However, the misprint occurred in the original article and is repeated here exactly as it appears in the Dutch. Many 'adjustments' have been made to original descriptions etc by subsequent writers - without a reference to this having been done - leading to inevitable confusion at a later date. It would therefore appear preferable not to 'correct' an original.

"It must have been about 1965 when I sent off to Su-ka-flor for a batch of plants which included a *Sulco.* 'canigueralii'. This particular plant was on its own roots and it would be barely one centimeter across so that on being unpacked one felt it had been an expensive buy. However, the root was thick and tapering so that the plant looked just like a miniature carrot and I suspected that it might be a collected specimen rather than seed-grown in cultivation.

"Two years later it produced a single flower, which opened so wide and flat that it left the stamens standing above the petals, which were bent backwards slightly against the plant body. One gained the impression that there was only a single row of petals, although this was not born out by a closer scrutiny. Perhaps the pronounced lack of taper over the greater length of each petal and the blunt tip, making them look like straps, led to this impression. I suppose one could describe their colour as pinky-violet, the lower part of the inside of the petals and the throat of the flower being white.

"A search of the literature failed to produce any description which matched the flower observed. A further *Sulco. canigueralii* was acquired in 1970 and when this bloomed in 1971 the flower proved to be the 'tricoloured' sort to which reference has already been made. By that time I had had flowers on several other *Sulcorebutia*, none of which were close to the so-called 'canigueralii'. I knew it was not one of these species but was no nearer finding out what it should be called.

"On receiving the July 1971 issue of *Succulenta*, the Dutch Cactus Journal, there on the front cover was a fine colour photograph by A.F.H. Buining of a *Sulcorebutia* carrying exactly the same flower as my unknown specimen, which I can now label *S. mizquensis*. My own colour slide of this plant in flower is with the *Sulcorebutia* Robin, which I would very much like to see traced."

We would be pleased to receive slides of the more recently discovered species of *Sulcorebutia* in flower - A.W.C.

MATUCANA AUREIFLORA from John Donald

The article on this species in *Chileans* No. 18 contained a reference to the phrase "the youngest areoles in the crown bearing no scales". There is a typographical error in the K.u.a.S publication - instead of "keine schuppen" which translates as no scales, it should read "kleine schuppen" which translates as small scales. Observation of the young tubercles and areoles in the crown clearly shows that the emergent tubercle and areole ends in a sharp tooth or scale pointing towards the centre of the crown. The fate of this scale or tooth is to become a very small lump or pimple on the tubercle and ultimately to disappear altogether on fully mature tubercles. It is strictly not part of the areole but only appears so by the close proximity of all the tubercular features on an emergent tubercle; as the tubercle grows so does the distance between the areole and the 'tooth'. Other *Matucanas* from the Cajamarca department show similar growths to a lesser extent, e.g. Lau 115 & 118. These latter are typical of the *Submatucana* group, with long tubed, more or less zygomorphic orange-red to blood-red flowers, so that the tubercular tooth appears to have little importance as a generic or subgeneric differentiation.

(As observed in the article referred to above, the small scales had been noticed on a number of these plants, but the simple explanation of a misprint in the German had not been considered!)

COSTS AND QUERIES

In the current climate of rising costs we are endeavouring to keep careful control over our expenditure. Quite a number of purely administrative queries have been received by the Membership Secretary and Treasurer which has involved additional postage costs. It would be much appreciated if a stamp - or, better still, a S.A.E. - is enclosed when making a purely administrative enquiry.

The slide librarian will continue to send out lists of plants which are available, on receipt of an S.A.E. The list will be sent out as and when plants do become available in order of receipt of enquiries; normally the S.A.E. will not be used merely to advise that there are no plants currently available!

Our No. 19 Journal was delayed in getting to the Editor and the printers whilst arrangements were in hand for our Cactus Tour; however, our printers also took longer over that issue than any preceding one and in consequence it is possible that No. 21 issue will not reach subscribers before the end of March. It will contain the subscription renewal form for 1972-73, when a small increase in subscription rate will be inevitable.

The recent rise in overseas postal charges means that our overseas subscription rate is now out of line with actual costs. We are grateful to overseas members who have rounded up their remittances to assist us in meeting these expenses.

CHILEANS ROBINS

A number of our Robins have not been seen by their Leaders for some time; we are especially concerned over the Photographic and Sulcorebutia Robins which contained slides etc. Would any members who happen to have a Robin in their hands at the moment (or have recently posted one overseas) kindly advise the Robin leader concerned, to this effect.

1972 CHILEANS NATIONAL GATHERING

We are still able to accept provisional bookings for this event which will take place at Brooksby Agricultural College, near Melton Mowbray, on September 8th - 10th 1972. The weekend will consist of both formal lectures and informal discussions with specific groups of plants. Full details from the Course Secretary, Mrs. J. Hobart, 39 Woodside, Darras Hall, Ponteland, Northumberland.

PLANTS

At the time of going to Press the Slide Librarian had on hand a selection of plants for sale for our funds, mostly grafted. Various sizes are available from grapefruit to fruit drop size: some stocks are badly scarred by from previous experience with others in similar condition, these can be grown on or degrafted with little trouble. A S.A.E. with your enquiry will be appreciated.

FORTHCOMING ARTICLES

We should be pleased to hear from any members who have succeeded in establishing any imported specimens of *G. izozogzii* or who have grown any from seed; or who have grown *Notocactus minimus/caespitosus/tenuissima*; or have grown *G. oenanthemum* and *G. tillianum*; or have flowered a *Denmoza*; or possess a *Gymno. moserianum*; or have flowered any *Cleistocactus* other than *C. straussii* or *C. wendlandiorum*; or have a mature *Thrixanthocereus* with a cephalium.

SEEDS

Many of you may now have ripening fruit on plants in your collection and you may be preparing to sow some of the seeds or pass some on to friends. If you do have any seed surplus to your needs, please send it to your Seed Exchange Organiser, J. Hopkins, 22 Crossefield Road, Cheadle Hulme, Cheadle, Cheshire, SK8 5PD.

Even if you can only spare five or six seeds of *Lobivia*, *Sulcorebutia*, *Weingartia*, *Notocactus* or *Cleistocactus*, these will be very valuable for study purposes.

1972 YEAR BOOK

It is anticipated that our 1972 Year Book of Field Collection Numbers will be available around March/April 1972 - price 65p (Home) \$2.20 (overseas).

STUDY GROUPS/ROUND ROBINS

Cleistocacti	A.A.Sadd, 26 Carlisle Street, Island Bay, Wellington S.2 New Zealand.
Copiapoa	D.J.Lewis, 80 Pencisley Road, Llandaff, Cardiff.
Epiphytes	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ.
Frailea	J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland.
Gymnocalycium	G.J.Swales, 5 Hillcrest, Middle Herrington, Sunderland, Co.Durham.
Hydroponic Culture	P.G.Hallett, Llaregyb, 20 The Garth, Bull Bay, Amlwch, Anglesey.
Lobivia	R.E.Hollingsbee, 46 Markland Road, Dover, Kent.
Matucana/Borzicactinae	Contact the Chileans
Mediolobivia	J.R.Chapman, 5 The Crescent, Raunceby Hospital, Sleaford, Lincs.
Melocactus/Discocactus	Mrs L.Teare, c/o Australia - New Zealand Bank, King Williams & Currie Sts, Adelaide, South Australia.
Neoporteriae	D.Rushforth, 80 Cheltenham Road, Gloucester GL2 0LX.
Notocactinae	K.H.Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton.
Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lins.
Photographing Cacti	A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees, Teesside, TS18 5LY.
Sulcorebutia	W.G.Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs. FY5 5EG.
Trichocereus	N.T.Hann, 5 Lake Road, Shirley, Croydon, Surrey, CR0 8DS.

THE CHILEANS

Organiser	H.Middleditch, 5 Lyons Avenue, Hetton le Hole, Co.Durham, England.
Editor	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ.
Treasurer	R.L.Purves, 19 Brocks Drive, Fairlands, Guildford, Surrey.
Membership Secretary and Back Numbers	Mrs A.Lavender, 62 Finchale Avenue, Billingham, Teesside, TS23 2EB.
Seed Exchange	J.Hopkins, 25 Crossefield Road, Cheadle Hulme, Cheadle, Cheshire SK8 5PD.
Slide Librarian	A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees, Teesside, TS18 5LY.

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