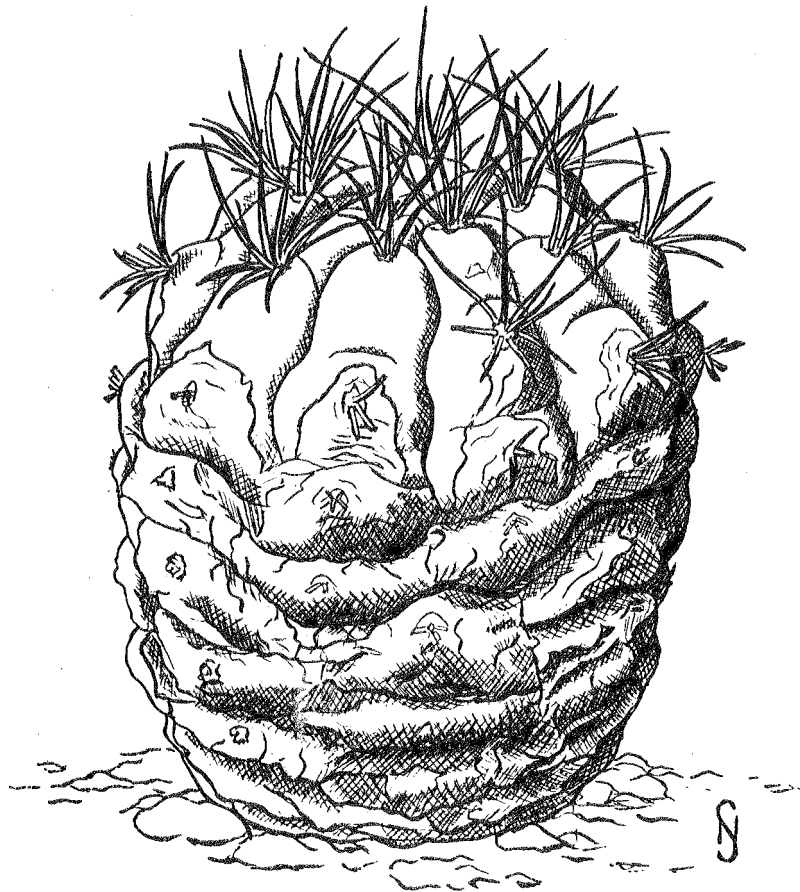


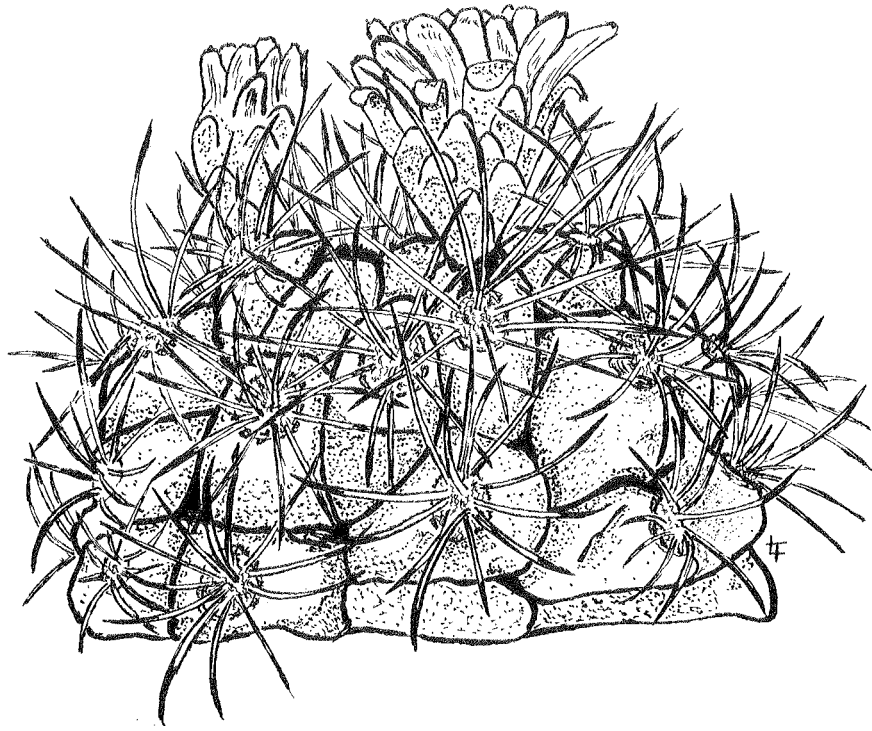
THE CHILEANS ' 72

VOLUME 5 NUMBER 21

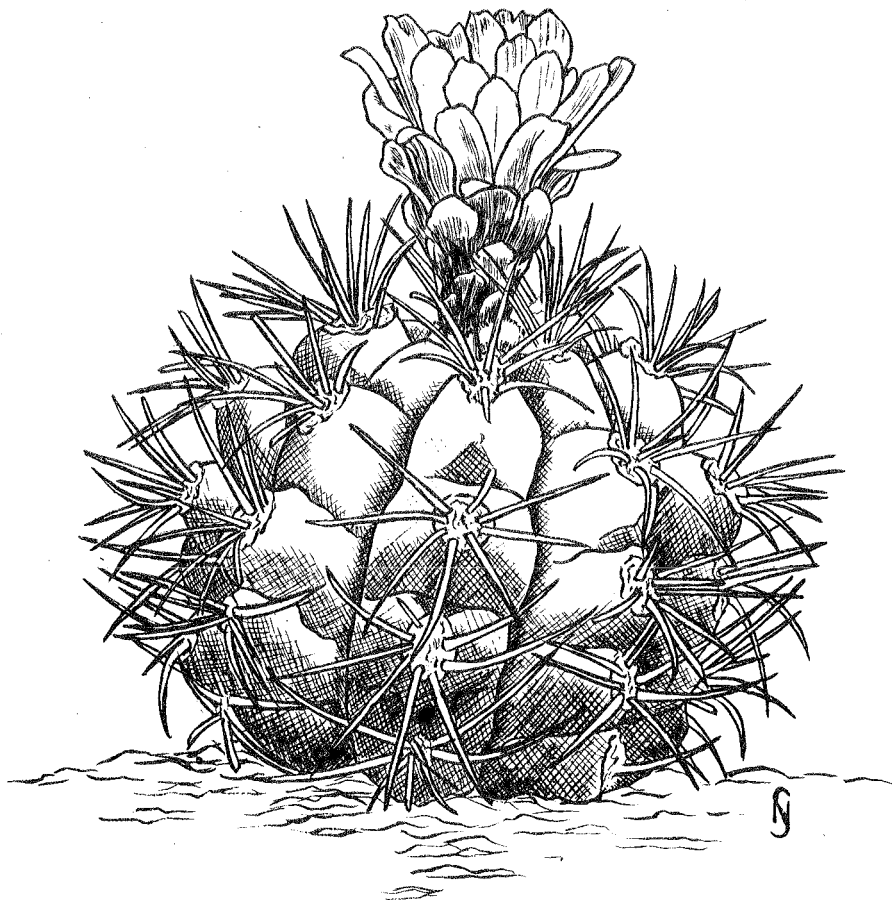


GYMNOCALYCIUM PFLANZII

Collection-H. Middleditch.



GYMNOCALYCIUM SAGLIONIS
Collection - T. Lavender



GYMNOCALYCIUM PFLANZII.
"Cactus" (Belgium) 3. 1. 71.

GYMNOCALYCIUM PFLANZII (Vaupel) Werd. by M. Broeckhoven

(Translated by H. Middleditch from Cactus 3.1.71.)

Amongst the green coloured 'Gymnos' with short or insignificant spines, the species which concerns us here holds a special place as much on account of its origins as of its plainly stronger spines.

It was named after consul K. Pflanze who discovered it in the neighbourhood of Villa Montes in Bolivia, more exactly on the sandy escarpments at Palo Marcado in the valley of the Rio Pilcomayo at 50 Km down the river from Villa Montes.

G. pflanzii is easily recognised by its matt yellowish green appearance and by its rough epidermis which is somewhat reminiscent of that of a peach. If one depends upon the original description, the height reaches 50 mm and the diameter 100 mm, but many reliable writers indicate that, in its habitat, one comes across examples reaching 500 mm in diameter! The old specimens have a little white wool in their growing point; their strong and thick ribs are divided into tubercles of very irregular shape at the base.

Whilst among the other species of *Gymnocalycium*, these tubercles become prominent and take on the shape of chins between the areoles, those of this species do not take on this appearance and develop furrows below the areoles in the form of the crescent moon which give a very special appearance to the plant.

The areoles are elliptical and reach 10 mm in length by 4 mm breadth and are sometimes 40 mm apart; they are placed in depressions and at first are furnished with long flocculent white felt which disappears with age. The 6-9 radial spines which are distinguishable with difficulty from the central spines, may reach 25 mm in length; they are slightly recurved towards the end, sharp, and as they are stiff, very fierce; they are brownish red at first with blackish tips and very glossy, but on ageing they become wrinkled and of a dirty pinkish-white colour with dark tips.

The flowers are white or pale pink and appear in large numbers in the month of June from the young areoles on the crown of the plant. They have a height and diameter of about 50 mm. The ovary and the flower tube are olive-green to brownish and furnished with thick brown scales with much paler edges. The stamens are quite peculiar as they remain attached to the flower tube by their base and inserted all the way up the walls; the highest are quite curved over towards the centre; all are of a purple colour with yellowish anthers and overhanging the pistil which is likewise purple.

The seeds are globular, a little like a helmet in shape and do not reach 1 mm in diameter.

G. pflanzii is very interesting from the point of view of its classification. If one only takes into consideration its external appearance and its spines, one would be tempted to relate it closely to *G. saglionis* (of which it could well be only a variety?) although the latter is only found further south in the continent: Tucuman and Salta in the north-east of Argentina.

However, if one studies the structure of the seeds which more and more are becoming the deciding criterion for many botanists, one would rather relate them to *G. oenanthemum*. How could we have clearly-defined ideas on this subject since the botanists themselves do not yet appear to be in agreement: C. Backeberg includes it in his sub-group 'Gibbosa', F. Buxbaum in his series 'Pflanziana' and quite recently Dr. Schutz classified it in his subgenus 'Microsemineum'.

This very fine plant is beginning to be found more and more in collections although one has scant hope of finding it at commercial nurseries since it is indeed not a commercial species; its growth is very slow during its early years and it is necessary to wait a good time before obtaining specimens of marketable size. This is no small wonder if one thinks about the fineness of the seeds; how could such a small seed yield a young specimen of rapid growth? Although small, they are however endowed with excellent potential germination and, when sown in the spring and if the seedlings are well cared for, one may look forward to have graftable seedlings around about the

month of August (on *Echinopsis hybrid*) which will continue to thrive for a further two months and the following year will have reached a size which allows them to be transferred to a stronger grafting stock such as *Tr. spachianus* where they reach an acceptable size in a few years. One may, according to one's own inclinations, leave them there to stay or put them on to their own roots but, in that case, it is necessary to provide them with a rich and porous compost.

One may overwinter them without heat providing one accepts the slightly washed-out colour during the resting season.

It is, in my opinion, a very handsome *Gymnocalycium* which could not spoil any collection, and I would go so far as to recommend it to those who are not interested in this genus in wishing them every success.

Comments on *G. pflanzii*

..... from G.J. Swales.

"I would agree that there is some similarity in spines and body form to *G. saglione*, but in fact the seed is quite different. It is one of the smallest seeds in the genus and is quite rightly grouped by Buxbaum with *G. zegarrae*, *lagunillasense*, *comarapense*, *marquezii*, etc.

"The seed of *G. oenanthemum* bears no resemblance whatsoever to that of *G. pflanzii* and only a very superficial one to *Gymno. saglione*. Again, Buxbaum separates *G. oenanthemum* and *G. saglione* into two separate groups, which under the microscope are obviously very different.

"As far as the Schutz classification goes, in terms of size the seeds of *pflanzii* are justifiably placed in the sub-genus *Microsemineum*."

..... from H. Middleditch

"The illustration accompanying the original article in the Belgian cactus journal (reproduced in the accompanying sketch) depicts a plant with a somewhat conical shaped body, slightly taller than broad. The ribs appear to be somewhat higher than on many mature plants in the *saglione* group and are divided by very deep cross cuts going down almost to the base of the ribs, so forming tubercles which are fairly tall and which also carry the areole right on the peak of the hump. Both the general body shape and the areole location struck me as being somewhat unusual for this group of *Gymnos* when I first saw the illustration. However, I was most interested to see an imported plant of *G. marquezii* in the collection of R. Sharman which also has the areoles on the peak of the tubercle and is, if anything, rather and more conical shaped than the Belgian plant. Apart from these two specimens, all the other plants of *G. pflanzii* which I have seen possess broad, flattened ribs with the tubercles separated by shallow grooves.

"My own plant of *G. pflanzii* was obtained from W. Wessner at Muggensturm on our 1971 Cactus Tour. The rather uncommon appearance of the body probably induced me to select this plant for it is about 3" in diameter but some 5" in height, columnar, with a low, rounded top. The ribs are very broad and the tubercles very low, rounded, humps. All but the topmost inch or so of the plant is the colour of pale brown earth - possibly because it has been immersed that deep in pale brown earth. Perhaps the summer storms in the Chaco swept increments of earth over the plant each season which it then grew through, or perhaps the plant pulled the growing crown down into the earth during the long winter drought. It is rather like a whodunit - was it buried or did it shrink? One of my other doubtfully-named *Gymno* seedlings (it has a label, but I doubt the name) appears to be growing well but the top of the plant is now one sand grain in depth below the surface of the soil - having gone there itself, starting from a more orthodox location over the soil. Presumably this sort of trick was learnt back home. I notice in other collections several imported *Gymnos* having a similar coloration near the base and as the concertina-ed tubercles become more turgid and the plant expands, the previously buried portion of the body becomes more evident.

"The *G. pflanzii* which I have seen have been either columnar, like the plant on our front cover, or flattened globular with "concertina-ed" tubercles near the base. The diameter has been about 60-70 mm and the height up to 100 mm; nowhere have I seen a plant anywhere approaching 500 mm in diameter - which does not mean to say that they cannot occur that size in habitat.

"The flower of *G. pflanzii* is generally similar to the other species in this group, with the uppermost anthers often being carried a little higher than the stigma lobes, but as the filaments are short and do not lean appreciably inwards towards the centre of the flower, the stigma lobes are usually clearly visible. I am puzzled by the description of the stamens as 'overhanging the pistil' as this is not within my experience. Furthermore, I would have described the stigma lobes as orangy-pink rather than purple in colour.

"My plant of *G. pflanzii* produced a bud in midsummer, which was so near to the centre of the plant that it leant inwards at almost 45°. The flower was upright when it finally opened but the base of the pericarp was not quite in line with the flower axis - perhaps it is this which leads Cardenas in the accompanying descriptions to refer to some flowers in the group as 'zygomorphic.' I can find no other explanation for this term, which does not really seem to me to correspond to the flowers which I have seen. The flower had the typical form of the group, with very pale peachy-pink petals. The slide which I took of the fully opened flower shows only a pale pink tinge to the petals, which suggests that the colour had faded slightly by then.

"On the map in this issue will be found the village of Palo Marcado, the original discovery location of *G. pflanzii*; this is situated where the Rio Pilcomayo cuts through the sandstone foothills bordering the Chaco lowlands. In his account of his trip through the Gran Chaco, Mr. Buining refers to collecting this species near the military post of Lt. Agripina Encisco, which appears to be located not far from Garapatal on the Trans Chaco road from Philadelphia; he also refers to seeing these plants on his day's outing from Fort Garay into Bolivian territory. Both these latter two locations will be found on the accompanying map."

..... from C. Webb

"My two plants of *G. pflanzii* both came from Fearn's nursery - one in 1967 and one in 1969 - both being imported plants. The areoles in the crown are very woolly indeed and the epidermis has a very marked velvety finish; I would agree with the comment in the article that it is a slow grower for that has been my experience, too.

"One of these plants came into flower in May last year, the greyish-pink rounded buds appearing from very near the centre of the plant. Eventually a fruit was set on this plant and when it split the seeds were retained in place inside the fruit by a semi-dry pulp. In discussion with other growers of these plants it is supposed that the seeds must be distributed by the agency of birds or animals - who may perhaps eat and subsequently eject the seeds - rather than by wind or weather, as would happen with dry seeds freely released from the fruit.

"One of my plants has, over the years, produced an occasional pup from the areoles at soil level; I have removed these in turn when they are large enough to root up - about 15 mm diameter. Their juvenile appearance is remarkably different from that of their parent for they have well rounded tubercles and outstanding reflexed spines, just like a miniature *G. saglione*. I have also taken a pup off my *G. nigriareolatum*, of a similar size, which was virtually indistinguishable from the pup off *G. pflanzii*. After a year or two, as they grow up, they get to look more like their parents. I had to be very particular about labelling these two pups and avoiding inadvertent confusion between them because of their similarity.

"Having read the comments by Dr. Schutz on this species, it would seem to suggest that there are but few differences between *G. pflanzii* and *G. saglione* and not very significant ones at that; however, I can see more differences in the habit of the bodies of these two species than just those points quoted by Dr. Schutz. The ribs in particular strike me as being different, those on *pflanzii* being distinct ribs divided by cross-cuts as can be seen on the illustration of the Belgian plant, whereas *G. saglione* has a collection of tubercles without any distinct ribbed

formation - as can again readily be seen on Tom Lavender's sketch. The spines also differ on a mature plant in the very much larger number of centrals present on *G. saglione* than on *G. pflanzii* - usually only one central spine is present on *pflanzii* whereas there are several on *saglione*. I cannot really agree with the comments by M. Broekhoven that the external appearance and spines of these two species would tempt one to relate them very closely.

"In addition, the flowers of *G. saglione* are not as large as those on *G. pflanzii*, which is also clear from the two sketches on the inside front cover.

"I have had flowers, fruit, and seed both from my *saglione* and from my *pflanzii* and I could see the difference in the seed even in the palm of my hand with the naked eye and would quite agree with the comments of G.J. Swales about this.

"The plant on the front cover would seem to me to be more like *G. lagunillasense* or *G. zegarrae* than *G. pflanzii*, on account of the less outstanding ribs and the wavy groove between the ribs.

"The imported plant which I received (also from Fearn) of *Gymno. marquezii* v. *argentinense* has very woolly areoles in the crown, just like my *G. pflanzii*, and also the same sort of velvety epidermis. The grooves dividing the ribs into tubercles, however, are almost straight rather than "crescent moon" shaped."

..... further from H. Middleditch

"I now have the description of this species from Backeberg's 'Die Cactaceae' Vol. III, which may be a repetition of Vaupel's or Werdermann's description of this species:-

"Single or now and then offsetting from below, hemispherical, becoming up to 50 cm thick in habitat, matt to yellowish green, velvety, with a roughness almost similar to a peach for example, ribs completely divided into tubercles, irregular at the base, strongly drawn up around the areoles, without chin-like humps, the part above the areole bounded by a half-arch; areoles up to 4 cm apart, slit-like sunken, up to 1 cm long, 4 mm broad, with thick woolly white felt above; spines awl-like, sharp, red-brown below at first, black above, later more or less rough, whitish with pink cast and darker tip, 6-9 radial spines - curved, outstanding, up to 2.5 cm long; central spines 1, like the radial spines; flower up to 5 cm long and broad; petals whitish to salmon-coloured, at the base more or less violet tinted; filaments violet, inserted at the base; style violet, just like the stigma; ovary-tube olive-brownish. Seed (according to Krainz) 1 mm in size, brownish black, finely tubercled."

"Having read this abstract I find that it compares well with the Belgian plant, thus from my first reaction to this Belgian illustration, thinking that it was far from what I considered to be *G. pflanzii*, I have had to adjust my ideas of what *G. pflanzii* should really look like. However, the 'slitlike sunken' form of the areoles does not seem to appear on the plants which I have examined with this description in mind. On the other hand, the extraordinarily woolly areoles on the crown of Chris Webb's two plants do not seem to me to be common - the wool must be some 7 or 8 mm long - but would appear to match the description.

"The feature of producing offsets from the base is something which I do not seem to have noticed before in connection with this particular species."

..... from J. Forrest

"My plant of *G. pflanzii* was obtained from Uhlig in 1968 as an imported specimen; it had no offsets when received, but in 1970 it started to produce them round the base; I have removed most of these and rooted them up and now some more offsets are appearing from the second row of areoles. The plant has flowered every year for me with the typical urn-shaped short-tubed flower with a brownish-pink coloured throat, but it has never set seed so far."

..... from Mrs. L.E. McIntosh

"I have a plant of *G. pflanzii* in a 4" pot, flowering merrily, which started as an offset from a collected plant."

A VISIT TO THE RIVIERA by Mr & Mrs T. Lavender

Whilst on holiday on the Riviera in the autumn of 1971 we took the opportunity to visit the Jardin Exotique at Monte Carlo, where the Director - Mr. Kronlein - kindly allowed us to browse round the nursery section which is not normally open to the public. In the greenhouse we saw a beautiful selection of imported *Melocacti*, most of which we had seen the previous year as freshly imported plants. They were now obviously well established, with a fine array of cephalia, varying from pure snow white, through others with brown and red bristles, to plants with almost pink cephalia. Many carried typical pink seed pods projecting above the cephalium.

An imported cutting of *Stephanocereus leucostele* was already showing evidence of an inch or two of new growth at the crown and one could discern the annual growth 'rings' such as are sometimes to be seen on *Cleistocactus straussii*. This plant was covered with numerous slender, shaggy, straw-coloured hairy spines - so dense that it looked rather like a shaving brush and made it almost impossible to see any sign of the epidermis or make a spine count. This particular plant seems to be rather uncommon in cultivation.

One may find many species of *Loxanthocereus* listed by Backeberg but apart from *Loxanthocereus gracilis*, examples of this genus do not seem to be common in collections. It was therefore particularly interesting to find an imported stem of *Loxanthocereus eulalianus* potted up and tied to a stake - presumably to prevent it adopting the decumbent attitude typical of this genus. The head of the plant carried about three inches of new growth which had presumably appeared in cultivation; this new growth was furnished with stout central spines, some three or four times longer than those produced (presumably) in habitat. Unless these longer spines are subsequently lost, it is rather surprising to see in cultivation a spicier growth than that from habitat. The habitat growth was remarkably similar to many *Haageocereus* seen previously, with numerous short fine yellowish spines all more or less the same length, at each areole. Two flowers from the upper part of the plant had just started to wither but were evidently a slender S-shape.

Having been forewarned of the article to appear in these pages on *Morawetzia* (Chileans No. 20) we kept an eye open for this species and found one which was carrying an unopened flower, which was growing out of the thick mass of chestnut bristles and white hairs which covered the crown of the plant.

An *Oreocereus variicolor*, growing with a free root run, possessed an exceedingly corky, dirty brown, stem. Three pups were growing from this corky stem - two of these branches carrying flowers which were not greatly dissimilar from the flower on the *Morawetzia*. The new central spines were chestnut colour, changing to a lighter fawn shade with age. There was practically none of the woolly hair present which one usually associates with plants of *Oreocereus*.

Also growing with a free root run was a fine columnar specimen of *Pilosocereus sartorianus* which must have been over seven feet in height, having typically few ribs. At the very crown of the plant almost every areole carried a thick tuft of long, fine, curly wool, so giving the plant a nice white woollen cap. Two flowers were growing from just below the top of the plant, with dark greenish pink tubes with few scales; the scales became pinker and less sparse in the transition to petals which were as yet unopened. Either the woolly hair must be lost after flowering, or else the plant had just started to flower for the first time, for the two flowers which we saw were growing from areoles situated just below the woolly crown.

There were also many *Cleistocacti* growing with free root run and I hope to be able to say more about these later.

In the centre bed of the greenhouse was a fine plant of *Rauhocereus riosaniensis*, having a stem more or less six and a half feet high and some $2\frac{1}{2}$ " thick. The few ribs were separated by a very distinct groove which had a slight - but very regular - zigzag. The tubercles were also very clearly separated by a deep groove which nearly reached the base of the ribs. The tubercles were almost flat sided with a slight rib being visible where these sides met. The new spines in the crown, a bright brownish-red in colour, stood straight upright. Close together, not far from the top of the plant, were six buds all about $2\frac{1}{2}$ " long, slightly tapered in the shape of a slim inverted cone. These buds were covered with numerous green scales, having some gingery brown wool in the axils of the lower scales. Although the buds seemed to be well developed, there was no broadening out at the top of the buds which were more or less flattened at their tips, where the scales were still as green as the rest of the tube.

A plant of *Thrixanthocereus blossfeldiorum* had attained a height of some 5' 6" and was forming a side cephalium along the uppermost 10" or so of the stem. The cephalium consisted of white bristly hairs, growing more or less upwards, with a sprinkling of slightly longer black bristles. The outer margin of the cephalium could be seen to be growing from more or less normal areoles, not in a groove as observed on those *Espositoa* so far seen with cephalia. The cephalium spread over a width of two or three ribs at its lower end and gradually spread over more ribs until it almost surrounded the crown.

Also growing with a free root run was a *Calymanthium substerile*, and this particular specimen will be worth a few notes all on its own.

An imported plant of *Pilosocereus* HU 257 had evidently become soundly established for it was putting out two buds. The stem was very much slimmer than any other *Pilosocereus* seen previously - about as slender as *Cleistocactus* - and divided into about seven fairly broad ribs, with a bluish-green epidermis. Only a few new areoles right in the crown exhibited some sparse, long, white woolly hair and the uppermost 4 or 5 areoles on each rib were covered in a dark brown felt which appeared to be lost or changed to pale straw colour with age. Two buds had arisen from quite close to the top of the stem, from areoles which exhibited no growth of long woolly hairs at all. The well-developed buds were slightly thickened at the base and club-shaped at the crown, quite naked, pink in colour shading to brownish-pink at the base. There were literally only one or two scales on the flower tube.

An imported plant of HU 242 *Coleocephalocereus fluminensis* v. *nova* had a very deeply ribbed stem, possibly due to the plant being still somewhat flaccid and not fully filled out - although we did see this plant as a then recent import on our visit last year. The close rows of vertical ribs carried only a few spines at each areole and at the crown of the plant was a cephalium which would measure about 4 or 5 inches from top to bottom. It was quite easy to see the individual tufts of ginger-brown bristles surrounded by the white wool of the cephalium, each tuft of bristles having grown at one areole. From this one could tell that the cephalium had started off at three ribs wide but soon became four ribs wide and was now ten or eleven areoles high. The bristles did not stand straight out, but curled over inwards so the bristle tips pointed back at the areole. From the slide which we took of this plant last year we can see that the bunches of bristles were then just protruding through the cushion of wool, the lowermost bunches of bristles protruding a little more than the remainder; this year, the lowermost bunches of bristles seem to have more or less uncurled and protrude much further from the wool and spread somewhat, so pretty well obscuring sight of the white wool near the base of the cephalium. This development is progressive from top to bottom of the cephalium. There are some new, straw-coloured bristles growing upright in the crown of the cephalium, the adjacent topmost bristles are pale ginger in colour and the bristles gradually darken to dark ginger near the base of the cephalium. Thus the cephalium seems to present a very changed appearance from when we saw this plant last year.

A two foot high imported stem of *Arrojadoa segredensis* was apparently well established, with some new growth from the terminal cephalium. This particular species was decidedly stouter than any other *Arrojadoa* seen previously - it had about 15 or 16 ribs. In addition to the short length of new growth, the terminal cephalium also carried a bud which seemed almost about to open. This

bud was rose pink in colour, with a bulbous base, the tube being barrelloid and so pinched in above the ovary and also below the unopened flower petals at the tip. The flower was apparently quite scaleless.

A nice plant of HU 22 *Discocactus boomianus* was just starting to form a cephalium in the growing point. The body carried pale straw coloured interlaced radial spines up to about 3.5 cm long, curled round the body. These spines were a tremendous length for a plant which would hardly be more than 8 cm in diameter. Right in the crown was a tuft of woolly hair and also a few long upright pale chestnut brown spines. This spiny plant was quite unlike the plants of *Discocactus* previously seen in cultivation which are rather like most *Gymnocalycium*s in their paucity of spination.

The *Platyopuntia* may perhaps be despised by many collectors but some sorts are magnificent, like the plant of *Opuntia quimilo* which we saw - with one or two spines per areole - but what spines! Up to 7" long, with a thickened base, chalky white in colour with a yellowish-brown tip. The small areoles have white felt and very short yellowish glochids.

Whilst many more imported *Weingartia* are now coming into collections, *Weingartia neumanniana* seems to continue to be uncommon; we found one of these plants here boasting a crown full of broad yellow flowers, at least six, all open at once. This particular plant was grafted and had grown somewhat club shaped but the latest growth was more or less globular, although perhaps somewhat open. Some of the areoles appear to be somewhat sunken, a feature which also occurs on our own plant. The fine dark spines remain more or less compactly bunched together. We managed to obtain an example of this species from Mr Delroue before our return. Both examples had offsets.

We also had an opportunity to visit the collection of Mr Marnier-Lapostolle at Les Cedres, where each visit seems to bring something new - and this time was no exception.

A plant of *Oreocereus de Tacna* boasted not only the long white woolly hairs commonly found on plants of this genus, but also some intermingled and equally long dark brown woolly hairs, on most of the areoles on the uppermost six inches or so of new growth.

Again there was considerable interest amongst the *platyopuntia*. An *Opuntia rivieriana* carried numerous flowers with deep rich red petals, but very striking was the flower tube itself which was a green colour and a texture just like the pad of the plant, except that the vestigial leaves on each areole of the flower tube were a brilliant red colour. There was a second plant, apparently identical, under the name *O. pittieri*.

A plant of *Oreocereus celsianus* about 7'6" high was carrying a single flower close to the crown, with the long, slender, slightly zygomorphic tube typical of this genus. The flower would be about 3" long, both tube and petals being pinky red in colour. The stigma lobes were green, the style pink and the stamens a deep rich pink colour.

Once again we found on the staging the plant of *Sulcorebutia hoffmanniana* which we had noticed and photographed last year. Presumably this is the plant which Backeberg used to establish this particular species of *Sulcorebutia* when he was curator at Les Cedres. This time we made a much closer examination of the plant, finding that the offsets had greatly increased in size and number since last year (unfortunately, none of the offsets inadvertently fell off while we were looking at the plant). The pectinate disposition and size of the radial spines was comparable with *Sulcorebutia kruegeri*, but some of the areoles on the main body also carried porrect slim brown central spines about 10 mm long.

Altogether the visits proved to be very interesting and yielded a very fine "bag" of slides, for both of which we are indebted to Mr. Kronlein of the Jardin Exotique at Monaco and Mr. Marnier-Lapostolle at Les Cedres.

Comments from H. Middleditch

"The spination on the *Weingartia neumanniana* and also the colour and petal density of the flowers on the plant photographed, differs substantially from the plant depicted in Backeberg's *Kakteen Lexikon*. I find it extraordinarily difficult to discover anything about this particular plant and I am absolutely green with envy over the specimen now in captivity which was brought back by the authors.

"On our 1969 Cactus Tour to the Riviera, we visited a nursery at Super-Cannes; among the specimen plants in the private collection there were two very fine *Oreocerei* which were perhaps three or four feet in height, each with several stems branched from the base. These were liberally furnished with the long white hair usually found on plants of this genus but, in addition, there were many dark brown hairs intermingled with the white ones in the topmost part of the plant. A day or two later we were visiting Keuntz' nursery at Frejus and I came across a single seedling plant of *Oreocereus*, about seven inches high, labelled *O. ritterii*, which exhibited a patch of this dark woolly hair near the crown. I have now grown another inch or two on to this particular specimen and it continues to produce this brown hair intermixed with the white.

"The comparison of the slides of the *Coleocephalocereus fluminensis* showing the change in the cephalium over the course of one year, were most interesting and instructive; the recent slide, showing the bristles "overtopping" the cephalium wool helps to explain how this particular terminology crept into Buxbaum's description of this genus, for this particular characteristic was entirely absent on the same plant, one year before.

"One tends to wonder if the central spines on the *Sulcorebutia "hoffmanniana"* were simply the result of growing on a graft - a characteristic abnormality with this method of cultivation on other species of *Sulcorebutia* which would probably be unknown when Backeberg first observed it on that particular plant.

"It would be most interesting to hear from any of our overseas readers who reside in a rather better climate than the U.K. and who are able to grow *Espostoa* and *Thrixanthocereus* to cephalium-bearing proportions, whether the gutterless cephalium has been found elsewhere on *Thrixanthocereus*."

WALTER RAUSCH - HIS 4th EXPEDITION TO SOUTH AMERICA
Part 3 - Conclusion (continued from *Chileans* No. 20 p. 26) by G. Streiter

(Translated by E.W. Bentley from the *G.O.K. Bulletin* Feb. 1971)

Argentina is the last stage of the journey. Again thrilling pictures - they provide us with at least a breath of the great adventurers, give us an idea of what it means in fatigue, in dangers and also mighty experiences when one says lightly "so you are going over to collect cacti". And so many habitat photos according to our standards appear to involve a quite foolhardy climbing tour.

Now we will resume the journey. Through torrential streams that in the dry season become again insignificant trickles; at one time we stand high above the clouds, around us stretch peak after peak, then once more the road goes through endless wide valleys in the high Andes that are covered with *Cerei*, *Opuntiae* and other spiny undergrowth. The juicy red fruits of *Cereus forbesii*, with dark red pulp are as large as a grapefruit. The "collecting" of *Tephrocactus* is probably no pleasure: one can hack away for a long time before one has freed their large roots! *Tephrocactus subterraneus* is difficult to find: its tiny, spherical, solitary little bodies attain only 1 cm, a 6-headed clump is a rarity.

Herr Rausch found a fabulously beautiful variety of *Echinopsis kermesina* with up to 10 cm long, flexible, tentacle-like spines. In Herr Rausch's view *Echinopsis kermesina* might better be regarded as a variety of *Echinopsis mamillosa*. In habit, flower-structure and seeds it is scarcely distinguishable from the white-flowering type; also the areole distribution points in this direction.

Lobivia dobeana (Speg) Dolz - thought to be lost - was found for the first time since Spegazzini, by Rausch, and for the first time brought to Europe. It is important for the clarification of the complex around *Lobivia andalgensis*, with which it has been muddled up in literature again and again. *Lobivia markusii* was collected once more; it produces large, golden-yellow spined spheres and flowers orange to red (it stands near *Lobivia chrysochete*).

The picture of *Lobivia pugionacantha* impressed me. A picturesque cliff in the background, in front on a small ledge the flat body of the plant drawn down deep into the soil, topped by an imposing tangle of dagger-like spines. *Lobivia grandiflora* (No. 525) produces a longish body; the flowers are red. In order to find the true *Lobivia famatimensis* on the Sierra de Famatina* they had to march and search all day long. Britton and Rose have put *Echinocactus famatimensis* in *Lobivia* and according to Herr Rausch that is correct. What is to be found by the dozen in our collections comes in all probability from Jujuy, sited some 800 Km further north and should be called *Lobivia densispina*.

And again a habitat shot that has impressed itself on my memory. A giant slab of rock divided into 4 quarters as with a stone-saw, forced into the crevices of which sit tiny red-flowering *Rebutias* (*Digitorebutia*). The *Rebutia* (*Digitorebutia*) with the number 333 is beautiful and interesting with almost white flowers (the name "Eos", morning red, is earmarked). *Rebutia* No. 521 produces a puzzle at present: it is not a true *Rebutia*, not an *Aylostera*, and *Mediolobivia* does not quite fit. Some confusion reigns over *Rebutia einsteinii*. According to Buxbaum it grows "in an isolated area". Herr Rausch was able to find it over a region 200 Km long. It grows in rocks and occurs over the whole area in many forms all mixed together: short or long spined, or more naked, flowers smaller or larger, the flower colour a lighter or a darker yellow. (In our collections it occurs under the names *Mediolobivia steineckii*, *M. conoidea*, *M. schmiedcheniana*, *M. columnaris*, *M. rubroviridis*,) The type corresponding to the oldest name, *Rebutia einsteinii*, which is large and quite rust-brown, occurs up to the Chilean border.

At 3,500 m we reached colonies of *Oroecereus trollii*. One spectacular shot in which whole slopes are covered with *O. trollii* and *O. celsianus*. A specimen of *O. celsianus* has brown wool - this form occurs very rarely in habitat.

And with this comes the end of the journey.

* (no typing error).

SOME OBSERVATIONS ON NOTOCACTUS FLOWERS AND FRUITS by Mrs. J.M. Hobart

From the observations made during the summer of 1970 on the (admittedly limited) range of *Notocacti* in my collection, it would seem to me, if one takes into consideration the characteristic features of the flowers and fruit, that there are four separate groups of species within the *Notocactus* genus:-

1. Grouped around *N. apricus*, including *tabularis*, *concinus*, and *crassigibbus* and called by Fric & Kreuzinger the *Setacei*.
2. Grouped around *N. ottonis* and its varieties and including *megapotamicus* - the *Paucispina* Fric. & Kr.
3. Grouped around *N. scopa* and its varieties and I would suggest also includes *brevihamatus*, *buenekeri* and *succineus*.
4. Grouped around *N. mammulosus* and including *submammulosus*, *brasiliensis* and *rutilans*.

The body characteristics of the *Setacei* are markedly similar and are sufficiently different from other members of the *Notocacti* to enable them to be separated without difficulty even without considering the flowers and fruits.

The flowers are very similar within the group, not only in shape but also in the time of day that they flower.

Due to the unusually sunny weather in June 1970 it was possible to observe the opening and closing of the flowers, without the added complication of lack of sun. Indeed, for the first two weeks in June there was virtually unending sunshine and for the latter two weeks many more sunny than shady days. I noticed that the *Setacei* group flowered over a common period in my greenhouse, from the last week in May to the third week in June. This group came into the general category of early flowerers, opening as they did from early morning - 8.30 a.m. or even earlier - and closing in mid-afternoon (about 3 p.m.). A shady morning would not be bright enough for the flowers to open but a sunny afternoon would not cause them to open after midday. They closed mid-afternoon in full sun.

The flowers have been described as funnel-shaped and are large, that is 60-80 mm in diameter, and are characterised by a red base of the flower tube due to the lowermost layer of the filaments being red. The outer petals have more or less red in them, this being marked in *concinus* to none in *tabularis*.

The fruit is a long slim structure, hairy to the base, which does not elongate. It eventually bends over and splits vertically at the side in one or two places allowing the seeds which are by then loose in the pod, to escape. The seeds of this group are very similar when viewed under a magnifying glass and are taller than broad and somewhat under 1 mm in diameter.

I have only one *N. ottonis* plant but this flowers in a different manner to the foregoing. Whereas plants in the *Setacei* group flower in a short burst, more or less all the flowers on one plant being together, *N. ottonis* puts up one or two flowers at a time over a period from mid-June to mid-September. By August it is possible to see buds, flowers and fruit all together on one plant. The flowers are large - some 75 mm in diameter, with lemon yellow petals with no trace of red. There is a short spiny termination to the outer petals. The stamens are arranged in the receptacle in a different manner to the *Setacei* and are sensitive to the touch. They move towards the style at a touch but not so markedly as in *N. scopa* for example, or *Malacocarpus erinaceus* or even in *Lophophora williamsii*. The pistil can be red or yellow and the red throat is again a feature of this plant but here is due not only to the filaments of the stamens being red but also to the red walls of the nectary chamber, which can be demonstrated by sectioning the flower. (Incidentally if anyone can suggest a method of preventing the style from curling forwards as soon as the flower is sectioned, I will gladly take some photographs of such sections.)

I would describe the flowers as midday openers, that is from 10.30 to 4 p.m., although this closing time may be due to the shade which falls on my greenhouse in the late afternoon.

I do not think that the fruits elongate; they are hairy to the base, not as slim as the *Setacei* but split in a similar fashion. Some seed pods bend over at maturity but most appear to remain upright. They remain on the plant for a long time. The seed is similar in size and shape to the previous group.

In the *N. scopa* group I would include *N. brevihamatus* and *succineus* and though I have only seen slides of the flowers of *bueneri* I would include that species as well. *Noto. scopa* and *succineus* are also similar to one another in spination and all the species in this group exhibit similar flower size, stamens, and fruits.

Noto. brevihamata is the first of my *Notocactus* to flower - this in the third week of May. It had four flowers and these came in a sequence, two at a time, although all four were out together on one day. *N. scopa* and varieties and *N. succineus* flowered over a period, particularly *scopa* which seldom has a ring of flowers out together. These flowers appeared from the beginning of July to the end of August. *N. succineus* flowered from the end of June to the middle of July.

The flowers of the plants in this group are much smaller than those in the previous two groups, ranging from 27 mm diameter for *succineus* to 52 mm diameter for some of the *scopa* flowers, in contrast to the 60-86 mm diameter of the previous groups. On first opening the stamens exhibit

some differences. In *N. breviamatus* the filaments are bent towards the style with the anthers hanging down, as has been observed in *N. buenekeri*. In *N. scopa* and *succineus* the stamens at first are bunched tightly together and twisted round the style, with the anthers held up in the normal fashion; about one hour after the first opening of the flower the stamens separate from the style to fill the receptacle. The stamens of *N. scopa* are very sensitive to the touch, especially in the sun, closing up rapidly and twisting tightly round the style when touched.

Whereas on *N. ottonis* the stigma lobes can be red or yellow in one stand of plants, in this *scopa* group there is a range of stigma colour from the completely yellow pistil of *breviamatus* to the totally red pistil (stigma and style) of *N. scopa* - which also appears in its variety *daeneckerianus* and in *N. succineus*.

The fruit in this group is markedly different from that in the previous two groups, but it is very similar on all plants within the group. The fruit does not appear to elongate and remains hairy to the base and upright at maturity. It is much smaller than the fruit of the previous two groups. The fruit of *N. succineus* split vertically at the side, allowing the seeds to disperse. It is difficult to draw any conclusions about the method of dispersal of the seeds from my one seed bearing fruit of *N. scopa*; indeed, the barren fruits had just the same appearance. The wall of the pod was so hard and shrivelled that I suspect that the whole fruit will come away from the plant intact, presumably either rotting away subsequently or being eaten, later allowing the seeds to disperse. In shape the seeds resemble those in the previous two groups.

Last of all I come to the *mammulosi* group. The body characteristics of this group are quite different to the preceding ones. The spines are tougher and harder and are similar within the group. The flowers may be described as bell-shaped. The stamens are not sensitive and remain close to the style, only loosening away from it a little as the flower matures.

In *N. mammulosus*, *submammulosus*, and *brasiliensis* the stigma always remains above the stamens, but in *N. rutilans* it was noticed that as the flower matures the stamens apparently grow, as at the end of the life of a flower the stigma is below the highest stamens. This group has a show of flowers, virtually all the flowers opening together. With me the flowering period is from the third week in June to the third week in July. The flowers open around midday and remain open even after my greenhouse comes into the shadow during the afternoon. *N. rutilans* has been observed open until 8.00 p.m. It was noticed that *N. brasiliensis* needed more sun than the other species to open at all and it never opened widely. It also set no seed (it must be said here that the plant was received from Belgium in bud and this may have affected the seed setting capacity of the flower and perhaps its size as well). The flowers in this group vary from 35 mm in diameter for *brasiliensis* to 50 mm for *submammulosus* to 60-70 mm for *rutilans* up to 80-90 mm for *mammulosus*.

All my plants in this group with the exception of *N. brasiliensis* set seed with no effort on my part. Only one of the many fruits on *N. submammulosus* was void of seed. The shape of the seed is quite different from that of the preceding groups. They are larger than 1 mm in diameter and wider than they are high. Within the group the seeds are very similar, varying only in the colour of their testa, so far as could be seen with a hand lens.

The fruits, too, are quite different from any in the preceding groups. The fruits elongate as they mature and the wall of the lower part of the seed pod is much more sparsely covered with hairs. The colour of this wall changes as it matures, from being green to a straw colour and the fruits also bend downwards as they mature, drooping round the plant and shrivel at the base. The seeds are quite loose within the pod before this drying out occurs.

It was observed that although *N. submammulosus* and *mammulosus* appear to be very closely related, there were more differences in the characteristics of the plant body than I realised at first. The marked difference in the average number of seeds produced was also noted with surprise. *N. mammulosus* averaged 40 from six pods, *N. submammulosus* averaged 154 from seven pods and *rutilans* averaged 144 seeds from six pods.

In all the *Notocactus* species which I observed, the flower remains were persistent on the fruit.

Comments on 'Notocacti Flowers'

..... from H. Middleditch

"Many of the plants which are dealt with in this article are often regarded as very common - undoubtedly a valuable asset in adding to the display of flowers which we may reliably expect in the greenhouse in the summer, but they rather tend to be overlooked as a subject for more careful and painstaking observation and interest. I find the above observations and deductions are a fine example of how easy it is to gather together notes and observations leading to a much closer knowledge of the plant characteristics, a finer appreciation of the relationships between species, and a greater interest in ones own collection."

..... from J. Hopkins

"Certainly *N. ottonis* has opened its flowers for me fairly early in the day, but *pampeanus* does not open fully until the afternoon. *N. rutilans* does not even consider opening before about 2.00 p.m., at which time it opens quite rapidly and stays open for several hours."

..... from A.W. Mace

"I find the times of year for flowering quoted by Mrs. Hobart are all very late compared with my plants. For example, the *concinus* group are usually open in the first two weeks of May for me. This may be due to the earlier spring down here in the south-east of England compared with the north-east, or it may be due to the type of cultivation. The time of opening of this group I would generally confirm. Also the contrast with the *ottonis* group of opening all the flowers at once - one rarely gets more than three flowers open at once on *N. ottonis* whilst on *N. concinnus* I have had up to 15. Flower colour is not necessarily constant in this group as there is now a red flowered *Noto. ottonis*. Also occasional plants can have yellow stigmas. (The same with *N. scopa*).

"I had not thought of the relationship of the *N. buenekeri* group with the *N. scopa* group until this article and I find the idea interesting as the flowers of all these plants are at least superficially similar. I think that the flowers on Mrs. Hobart's *N. brasiliensis* were affected in size, opening, and fertility by the move. I had a plant of *N. acutus* under similar conditions which (just) opened two small flowers shortly after being imported from Uebelmann. In subsequent years the flowers have been more than twice the diameter. Flower size depends on the amount of nutrient available to the plant, the number of flowers and on the weather and can vary greatly in the *Notocacti* from year to year."

..... further from H. Middleditch.

"Let us hope that it will be a good year for *Notocactus* flowers in 1972 and that those attending our National Gathering in 1972 will be able to bring some observations on their own flowers for the *Notocactus* discussion session."

WHAT IS A CEPHALIUM? - Part 3 by Prof. F. Buxbaum (Continued from *Chileans* No. 20 pp 30-35)
(Translated by Wood-Allum from K.u.a.S. 15.3.64)

In the previous part of this article it has been demonstrated that the bulk of the hair which forms the cephalium comes not from the areole on the plant body but from the microscopic areoles

on the cauline zone of the flower. Whether it is only a woolly crown which develops at the growing point - as for example in *Pseudomitrocereus fulviceps* - or a permanent cephalium running down the plant, depends upon whether the cauline zone drops off with the flower (or the fruit), or remains on the plant body. When the abscission layer lies between the cauline zone and the pericarp the cauline zone will remain on the plant body and so form a permanent cephalium.

This, then, is the solution to the question on the morphological nature of the pseudocephalium. Where a pseudocephalium occurs, normal ribs with normal areoles are first formed from the growing point of the plant and it is only when the flowers begin to develop further down the plant body that the cauline zones form the long hairs of the cephalium. These long hairs can be formed at an areole whether or not the flowers develop.

The fact that genera which develop pseudocephalia do display strong hair growth from the vegetative areoles is proof that with a general tendency towards the formation of strong hair growth from normal areoles, the areoles of the cauline zone have the same tendency. The pseudocephalium is therefore not part of the plant body, even though it may remain on it, but develops from the basal sections of the flowers.

But the true cephalium is no different, except for a transient delay in flowering. Whilst with a pseudocephalium, the podarium and areole is fully formed before the flower begins to form, in a true cephalium the flower begins to develop at a time when the podaria and areole which bear it are still in the first stages of development, as with *Neolloydia* and many others. This earlier flower development has the effect of not allowing the flower-bearing podarium, nor the thorns, to develop in the same way as those on the vegetative zones of the plant. The podarium remains small, and usually cannot merge with its neighbours to form a rib, the areole thorns remain weak, and are mostly thin, like needles or bristles. This can be seen very clearly if you take a longitudinal section through a plant to dissect on the one side the cephalium and on the other a vegetative rib. (Chileans No. 10 p. 8).

In the immediate vicinity of the apex of the stem which bears a cephalium, it can be quite distinctly seen that the podaria in the cephalium remain small and isolated and the thorns are thin, whilst the remainder of the podaria have strong thorn growth and the podaria have also grown towards one another to form ribs.

A longitudinal section through two podaria (tubercles) of the cephalium shows clearly that the young stem apices which will produce flowers are interspersed by equally heavily hirsute areoles with fine bristly thorns. A greater magnification will show the innumerable microscopic rudimentary leaves of the flower-producing stem apex on the basal parts of which lie the microscopically small areoles of the cauline zone which are furnished with such long hair.

The reduction in size of the podaria of the cephalium has two striking consequences. Since they are much lower than the normal ribs they are, compared with the latter, to a greater or lesser extent, sunken. Because of lesser latitudinal growth the cylinder of fibro-vascular tissue is sometimes flattened on the cephalium side so that the sunken effect is even more striking. (Shown in sketches Chileans No. 10 p. 8).

It is however morphologically impossible (for the reasons already given) and therefore a mistake resulting from very meagre botanical knowledge and equally scant study, to maintain that this "gutter" or "split" cephalium "breaks out" of a "split" in the "heart of the plant body". If you examine a young cephalium of *Espostoa sericata*, for example, you will see that the ribs in the same vertical line as the cephalium but growing lower down the stem, run into the cephalium. This cannot be seen in an old cephalium, however. Since the podaria of the cephalium may be smaller than those of the vegetative side, the top of a columnar cactus may often be inclined in the direction of its cephalium.

Yet another phenomenon is explained because of this. The podaria of the cephalium lie, as a consequence of their initial smallness, close together; but later they become roughly circular in shape as the flower develops fully and for a variety of reasons they become arranged in such a

way that the vertical lines of areoles become indistinct and the podaria, now nipple shaped, seem to be arranged diagonally.

In many cases (e.g. *Mitrocereus militaris*) however, you get a further stage where there is an increase in the vertical ribs where the cephalium covers the whole of the plant. The diameter of the plant body remains the same and the cephalium closely resembles a bearskin (hence the name *militaris*). In contrast to this, the terminal cephalium of *Neoabbottia paniculata* is clearly reduced in diameter compared with the non-flowering growing area. Since the few ribs in the cephalium side are not increased in size, they are, as a result of the formation of the cephalium, much less protruding than the ribs of the vegetative side.

Comments on "What is a Cephalium"

..... from H. Middleditch

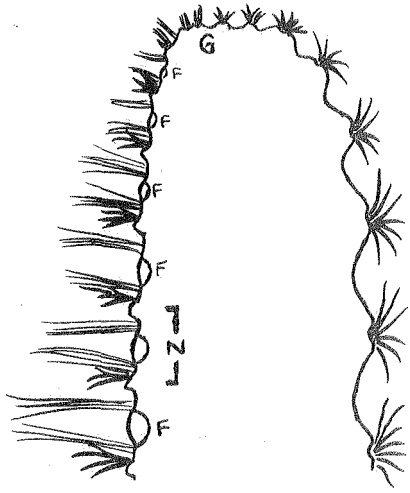
"During our very first Cactus Tour in 1962 we spent a week on the Riviera, during which time we visited a number of the prominent and very fine collections to be found clustered along that short stretch of coastline. I suppose that on that occasion I must have had my first introduction to a cereiform plant with a cephalium - indeed, not just one such plant, but almost a surfeit of them.

"At the time I suppose I regarded the cephalium as some unexplained and odd woolly excrescence, but when we made a return visit on our 1967 Tour I did pay somewhat more attention to various plants carrying a cephalium. There was an *Espostoa* in the Jardin Exotique at Monaco which had a flower still almost open when we arrived in the morning, but rather too high up on the tall stem to be practicable to photograph. The cephalium down the side of the stem must have been almost a yard in length. At Stern's nursery we found a *Vatricaria guentheri* whose numerous long stems each bore a cephalium, one or two of which had flowers which were almost wide open. The long side cephaliums sometimes terminated in a cap of bristly hairs covering the whole of the crown of the plant. Here at Stern's we also found a *Pilosocereus* with great thick tufts of long fine woolly hair growing from what were otherwise normal areoles, and we were very fortunate in finding a flower open on this plant - most conveniently situated at a very suitable height for the camera.

"At Pallanca's in Bordighera we could examine closely the stems of various cephalium bearing *Espostoa*, one of which is pictured in *K.u.a.S.* with this article by Buxbaum. A very narrow cleft commenced right at the very growing tip of these cephalia, gradually broadening out just below the shoulder of the crown where the cephalium wool first started to appear. In another six or eight inches downwards the wool had reached its final length which it continued to retain as the cephalium grew with the stem, and at the same place as the wool reached its mature length the cephalium had also reached its mature width. At about this same point one could see the topmost flower remains, which were also in evidence down the rest of the length of the cephalium.

"These observations probably stirred my interest in the article by Buxbaum entitled 'What is a cephalium' when I acquired the 1964 issues of *K.u.a.S.* The very meticulous translation by Keith Wood-Allum proved difficult to digest for quite some time. This difficulty was compounded by the nature and layout of some of the sketches accompanying the original article. One pair of the German sketches depicted in the first of the pair a vertical section of a stem with the cephalium on the left hand side of the stem, the companion sketch of a comparable section having the cephalium on the right hand side. In the second pair of sketches a magnified section of the cephalium was shown in the natural vertical position and the accompanying sketch showed the cephalium areoles horizontal. These complications have not been repeated in the diagrams accompanying this article.

"There appears to be little doubt that the terms cephalium and pseudocephalium have been interpreted in different ways by different authors; in this article Buxbaum offers a logical application for each term i.e. where the cauline zone of the flower is formed right in the growing point



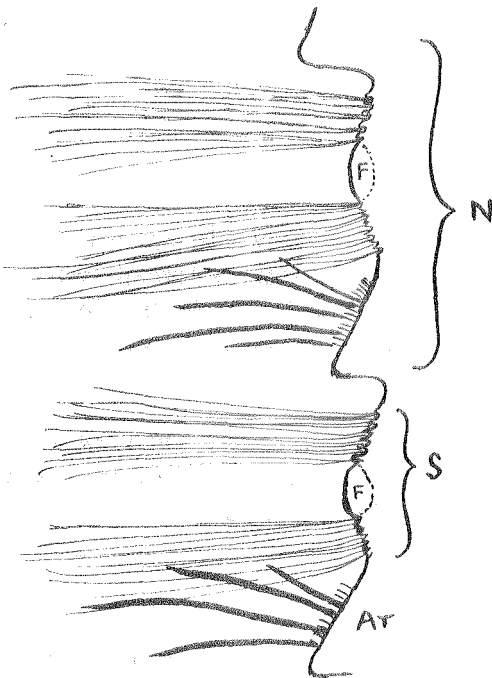
TOP OF STEM OF ESPOSTOA SERICATA -
LONGITUDINAL SECTION THROUGH SIDE
CEPHALIUM.

NORMAL AREOLES ON RIGHT HAND SIDE,
CEPHALIUM ON LEFT HAND SIDE.

G - GROWING POINT

F - INCIPIENT FLOWER BUD.

N - ONE NODE.



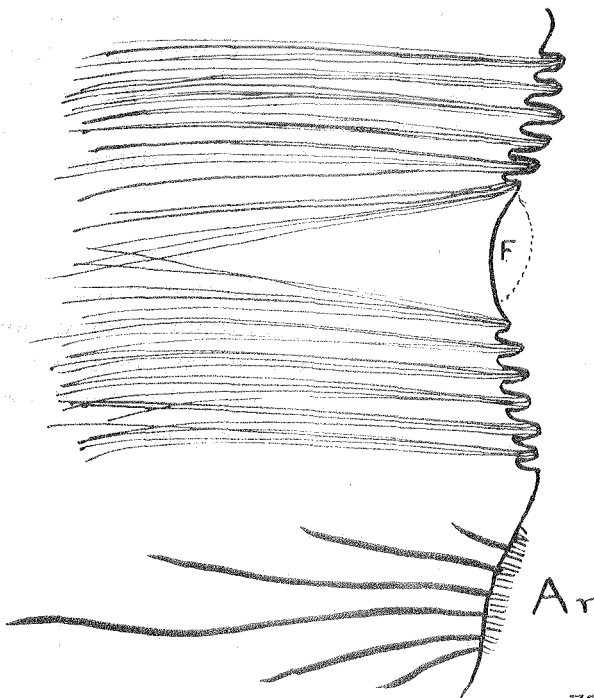
ENLARGED SECTION OF
TWO NODES FROM SIDE
CEPHALIUM.

N - ONE NODE.

S - SECONDARY AXILLIARY
GROWTH.
(CAULINE ZONE)

F - INCIPIENT FLOWER BUD.

Ar. - AREOLE.



ENLARGED SECTION OF
ONE NODE FROM SIDE
CEPHALIUM.

Showing individual areoles
and vestigial leaves at
each areole in cauline
zone.

See "What is a Cephalium"

then the result is a true cephalium; where normal areoles and tubercles are formed on the stem and a cauline zone with its long hairs subsequently appears, this forms a pseudo-cephalium.

"The diagram of the greatly magnified section of one cauline zone shows that this is composed of numerous nodes, each node consisting of a miniature areole and a vestigial leaf. The botanical construction of the cauline zone is thus identical to that of the leaf-bearing stem-like axillary growth shown in the fourth diagram on p. 32 Chileans No. 20 - on that diagram the nodes are disposed along a stem and in a cauline zone the nodes are crowded onto a hump. A cauline zone is thus botanically similar to a leaf bearing axillary stem growth but is reduced in length.

"The accompanying diagram showing a vertical section through the uppermost part of the stem of a cephalium on an *Espostoa*, shows how the cauline zone grows in size from its origin in the growing point to the mature cephalium. This explains the correlation between the width of the cephalium groove, the length of the cephalium hair, and the upper limit of flowering, observed on the *Espostoas* at Pallanca's nursery, referred to above."

THAT LATIN!

..... from A.J.S. McMillan

"On the subject of Latin diagnoses, do you really think it is worth reprinting them? I mean, does anyone wish to read them - I thought they were merely a necessary formality in the publication and authenticating of a plant. Surely they aren't of any value so far as description is concerned because they are usually so brief and the vernacular description is more comprehensive. Surely all that it is necessary to say is "Latin diagnosis in....."?

"Finally, if you still think there is some value in reprinting them, I must protest most strongly against ghastly efforts like 'carrotiformibus' and 'plusminusve' which are neither Latin nor anything else! I feel almost like writing a letter to the Editor about it!"

from G.J. Swales:

"First let me disclaim any substantial knowledge of classical Latin, other than that derived from a fifth form exam taken almost thirty years ago. My equally limited knowledge of botanical Latin is derived from the excellent book on the subject by William T. Stearn published by Nelson, 1966. However, it is essential to realise that the two languages are not necessarily the same thing. To quote Stearn, botanical Latin is "a channel of communication now so distinct from classical Latin ... as to require independent treatment". He describes it as "an international language used by botanists the world over for the naming and description of plants little research can be done in systematic botany without recourse to earlier literature written in botanical Latin."

"In the light of this, I would say that it is worth reprinting Latin diagnoses in our Journal. For example, it would appear that since the original descriptions were published (at least in some cases) the various species have 'evolved' considerably on paper as various authors have added or modified parts of the description to fit the plants they had in their collection (or, worse still, sometimes only fleetingly seen in other people's) the result being a new 'species' under the old name. The only way to resolve such a situation as this is to go back to the original diagnosis and many readers will just not have the facilities to do this.

"The criticism that the vernacular description is more comprehensive than the Latin is, alas, often true but it is the Latin one that counts if points of difference arise (and they often seem to). I entirely agree that hybrid words such as "carrotiformibus" (which should be dauciformibus) are to be deplored but on the other hand "plus minusve" is perfectly acceptable botanical Latin. Some attempts at botanical Latin are indeed appalling and aptly described by the botanist and scholar John Lindley circa 1830 as "written without

the encumbrance of learning" but we should not discard all such attempts on the basis of a few howlers. I should also like to point out that translation of Latin using Stearn's specialised vocabulary, aided by excellent diagrams, is far, far easier than German or French (or Czech!!) using an ordinary dictionary. So let us keep our diagnoses - a source of great interest to some and only a matter of skipping a few lines of print to others."

..... from D. Angus:

"It is not so long ago that I used to refer to Borg in order to look up a description of a plant, perhaps to check a name on a label: usually one would find a description that quoted a specific number of ribs, and spines, and so on, which enabled one to make a straight comparison with the spine count, length, and so on upon the plant under examination. Quite often there might be some smallish discrepancy between plant and description in spine count or length, or something else, as a result of which one might suspect that the label was perhaps not correct on the plant.

"Nowadays many collectors who are aware of the wide variations in individual species will disregard any minor discrepancy of this sort between a description and a plant evidently correctly named. More recent plant descriptions make allowances for this degree of natural variation: one reads that a certain feature is "more or less" flattened or elongated or whatever it is: that central spines may be "1-2 (-3) sometimes absent": and so on. So effectively have these descriptions departed from the earlier precision on numbers and shapes and sizes that I do believe that I could apply most recently written descriptions to almost any of the plants in my collection - they have ceased to be sufficiently specific to be of practical use in identifying a plant or checking a label.

"When looking at a batch of imports in a nursery and seeing in one species the wide range of spine coloration and length and so on it is quite easy to understand why a plant description has to be couched in general rather than specific terms. But since, for this reason, I find I can make little if any use of it - in English - the Latin description is obviously of no value to me and so I see no advantage in having them printed in 'The Chileans'."

..... from R. Moreton:

"Latin diagnoses have varying degrees of value depending upon the circumstances. In the case of very early descriptions of plants (going back to the 19th century, for instance) the Latin description given at that time, although in many cases regrettably brief, is the only description which can truly be said to be of the particular species in question, as far too many of the later vernacular descriptions of that same species contain errors, frequently due to the original description being embroidered unjustifiably to make it fit a plant in the possession of the author.

"In these cases, reference to the original Latin is invaluable. It sometimes happens, of course, that the original description was not in Latin, in which case the original description, in whatever language, is required.

"Another variety of Latin diagnosis is the sort often used by Backeberg, which is just a formality and not really worth the paper it is written on.

"A fair proportion of recent diagnoses contain a detailed Latin description as well as a detailed vernacular description. In these cases I feel that the vernacular description (unless it is in Japanese, for instance), is probably preferable."

..... from E.W. Bentley:

"I have nothing to add to the views already expressed about the repetition of Latin diagnoses in the Chileans. I would like, however, to make a point arising from the remarks made by D. Angus. I hope that he is not really against the recent practice of describing plants in such a way as to

cover the whole range of variations to be found in habitat. This doesn't make it harder to name plants correctly. Surely it is even a step in the right direction. What is needed next is not a return to exact descriptions of single plants - but fuller descriptions - particularly bringing in measurements of more characters such as floral details etc. - until the point is reached where problem species can be validly separated (albeit by numerical taxonomy if necessary)."

..... from H. Middleditch:

"Some time in the dim and distant past I used to have some bowls of earth on the front room window sill, in which were to be found (provided one looked carefully) some plants which I had been told were succulents. One day I discovered that if you watered them they would actually grow - and they have been growing since, into steadily bigger quarters. During the expansion process we had a visitor who let on that these plants had names, which were easier to remember if you wrote them on labels - and that started the appearance of labels in the collection. Later still, we found that there were even books written about these plants and provided you took the trouble to read some of them carefully you found out all sorts of interesting things about the plants. Then we had the occasional look round some collections on the Continent and acquired quite a number of plants which we did not seem to be able to find out much about in books, back at home. So we asked the then Editor of the National Society Journal if he could publish anything to improve this position; and obtaining a non-committal reply, in due course "The Chileans" was started. Ere long, it became clear that not every writer agreed with every other writer what sort of plant could rightfully claim to represent which name. Casting round for some guide in this confusion, like the traveller in 'Pilgrim's Progress', it became evident that the Latin diagnosis was at least regarded by all writers as the basic reference to be consulted. It was quite a pleasant surprise to find that the Latin diagnosis could be quite informative and interesting - and just as subject to potential errors as all the rest of the literature.

"Until that time, a Latin diagnosis had been regarded as something that did not really concern anyone interested in cacti. But, once upon a time, the plants did not have any labels either.

"There is no copyright in this story and anyone who wishes can follow the same path just as far as they happen to be inclined. I suppose that, just like the natural variation between individual plants in habitat which writers are so fond of telling us about these days, not all collectors are inclined to delve into the subject to the same depth. For those who find continued digging rewarding, I hope that the Latin diagnoses might provide an added interest. I will go so far as to admit however, that my heart does not leap for joy at the mention of numerical taxonomy. Perhaps we may receive some more comments on this subject at our Autumn get-together."

..... reprise from A. J. S. McMillan:

"I am grateful to Mr. Swales for making a distinction between classical and botanical Latin. Perhaps this accounts for the Smith minor 'Caesar adsum jam forte' flavour of some of the items. However, most of the diagnoses so far re-printed in "The Chileans" have been from recent issues of currently available Continental publications like K.u.a.S., Succulenta and Die Kakteen; there would be some point perhaps in re-printing diagnoses from some of the older monographs of, say, Karl Schumann, Gurke, Vaupel, etc. which are not so easily seen and some of which are controversial.

"On having a closer look I was surprised to see such marked discrepancies between some of the Latin diagnoses and the vernacular description, presumably by the same writer. In an example picked more or less at random from an article in this issue on *Coleocephalocereus*, a portion of the diagnosis reads - '*Pistillo stricto, stigmatibus partibus linearibus plerumque conniventibus. Ovarii cavo parvo, funiculis ovulum brevibus ± ramosis.*' While the vernacular

version is - 'Style stick-shaped with the stigma lobes disposed close together linearly like a stick-head. Funiculi from a basal, trunk-like piece \pm tree like, however only few branches or compact clumps with few branches.' A remarkably free translation! A little farther on we have 'embryone curvato cotyledonibus magnis' - yet in the vernacular a distinction is made between the embryo of *C. goebelianus* 'strongly incurled with large dicotyledons' and that of *C. fluminensis* 'egg-shaped, not curved, with short, blunt-triangular dicotyledons'. This surely makes a nonsense of the Latin diagnosis? What is the student to do in such cases? If he does refer to the original Latin diagnosis the information just isn't there.

"Latin fanciers (and non-fanciers) will have ample opportunity to 'brush up their Latin' on no less than six diagnoses in this issue amounting to more than a thousand words of Latin."

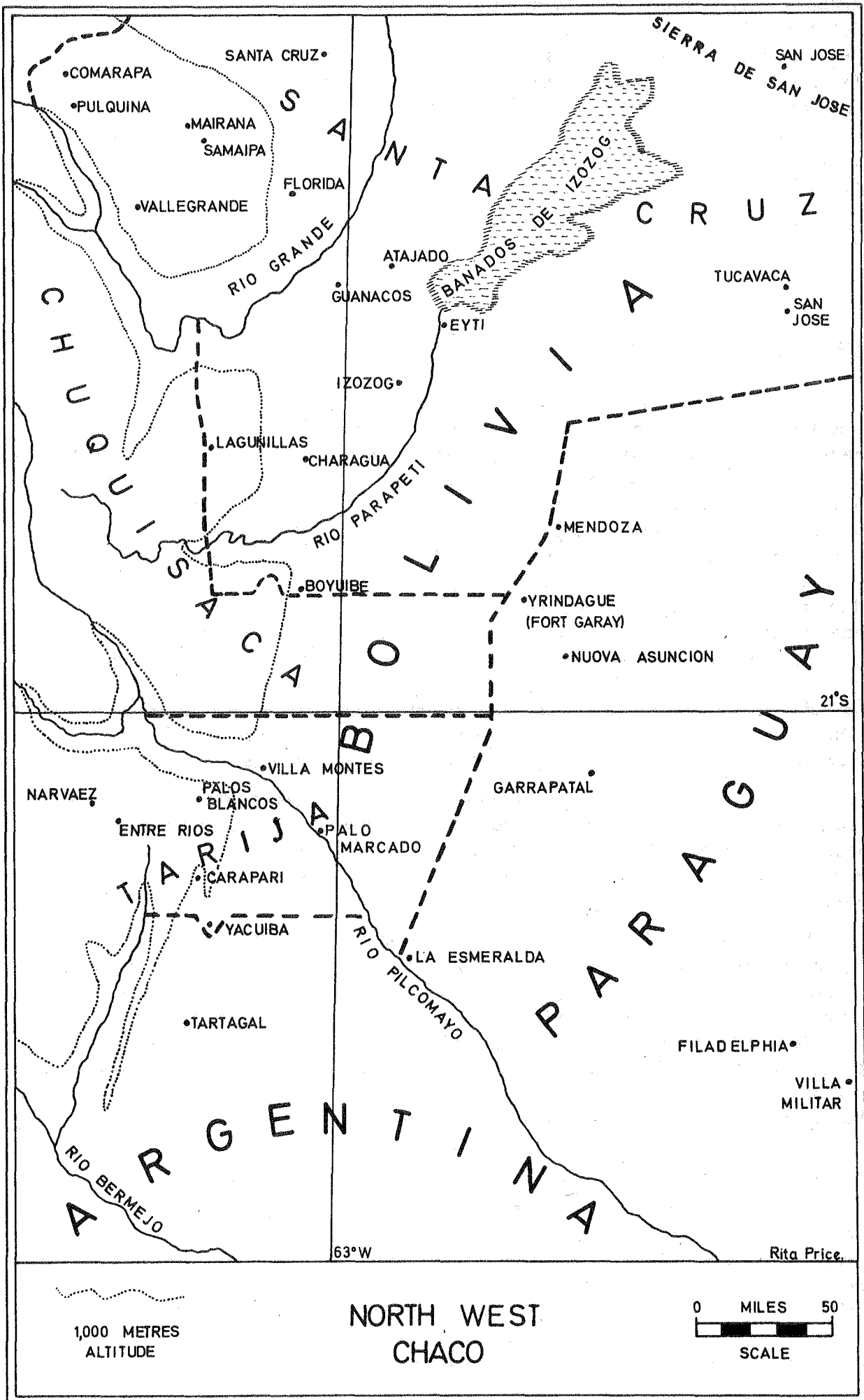
THE NORTH-WEST CHACO

The Gran Chaco is an extensive inland plain stretching from southern Bolivia for many hundreds of miles into northern Argentina and only a portion of this large expanse is included on the accompanying map. As Mr. Buining so aptly says in describing his trip to western Paraguay, there are very few inhabitants and little to encourage habitation. The land is monotonously flat for hundreds of miles, quite devoid of hills of any sort. The low altitude and the great distance from any open ocean produce unpleasantly high temperatures, especially in summer. Coupled with a poor rainfall, this results in an arid climate which gives almost no hope for agricultural pursuits. The paucity of water and the prevalence of insects, together with the coarseness of what grasses do manage to grow, even inhibits cattle ranching. Most of the rain which is received arrives as thunderstorms in a few summer months - because of the almost impervious nature of the soil and the almost level nature of the land, this causes extensive flooding; travelling is almost impossible at this time since the trail rapidly degenerates into a morass. Most of the area shown on the accompanying map (except the Andean flanks on the left hand side of the map) is virtually uninhabitable; the few names which appear in this waste, away from the rivers, are either military posts or poverty stricken Indian hamlets.

All this affords a remarkable comparison with the flanks of the Andes rising out of the west side of the Chaco. The appreciable rise in altitude from the Chaco lowlands to the chains of Andean peaks occurs over a quite short distance when travelling westwards; this causes onflowing air to part with its moisture, which falls as rain on young sedimentary rocks with a covering of pervious soil, so yielding a good vegetation cover.

Where the rainfall is heaviest on the exposed eastern flanks, an evergreen forest of meso-phytic trees covers the ground. Near Santa Cruz this forest is quite dense and covers a fairly wide altitude band - commencing well below 1,000 m altitude and extending almost up to 3,000 m altitude. Descending to lower levels, this montane rain forest passes through a transition to monte vegetation - thornbush, shorter and fewer trees, occasional patches of palms - and then to the Chaco scrub. At the upper limit of the rain forest, the clouds hang almost constantly for most of the year round, producing a very dense and very humid forest with crowds of epiphytes - the "Ceja de la Montana" of the natives (eyebrow of the mountain). Above this is a narrow band of hardwood trees and conifers; then just grasses and, finally, only bare rock.

Coming southwards down these mountain flanks, into Argentina, there is not only the gradual change to lower latitudes and thus less tropical climes, but the winds are more lightly laden with moisture too; the montane rain forest thus becomes gradually less luxuriant as one travels southwards, and also reduces in altitude range. In northern Argentina the lower level of the rain forest will still be below 1,000 meters but the upper limit will be about 2,000 meters altitude. There is a broader band of transition vegetation to the Chaco scrub over the piedmont which will now contain a greater proportion of thorny bushes and trees, whilst the band of hardwoods and conifers continues, just above the montana.



This forest does not form a continuous blanket over the eastern flanks of the Andes, for the foothills and flanks do not offer a uniform slope and aspect to the winds. There are steep rocky slopes unable to retain a soil cover and so bare of vegetation; the north-south orientation of the folds and faults in the foothills produces numerous leeward slopes which are in a rain shadow and carry only monte vegetation. The forest creeps some way up the valleys where the major rivers breach the eastern wall of the Andes. But generally the ground is so precipitous and the forest so thick that transportation from the highlands to the lowlands encounters many difficulties; and the adjacent Chaco lowlands being so unattractive, there is little to encourage the developments of roads or even trails between the highlands and the lowlands. The eastward facing flanks of the Andes over the area shown on the accompanying map probably represents one of the least well explored parts of the continent, perhaps posing even more difficulties for the explorer and collector than the inhospitable Chaco.

In the dry valleys cut into the Andes we find monte and other xerophytic vegetation and cacti. Cleistocacti are particularly prolific in these eastern valleys, likewise *Parodia* and *Lobivia*. The highlands in the north-western part of the map yield *Weingartia* - such as *W. pulquinensis* from Pulquina - and *Sulcorebutia*. The *Gymnocalycium* of the *Muscosemineae* type occur over almost all the Chaco lowland shown on this map; whilst *Gymnos* of the *pflanzii* group occur from Comarapa (*G. comarapense*) down through Vallegrande, Lagunillas, Boyúibe, Villa Montes and Tartagal, down into the Chaco as far as western Paraguay, and also off to the left centre of the map.

GYMNOCALYCIUM OF THE GROUP MICROSEMINEAE Fric - 5 by Dr. Bohumil Schutz

(Translated by K. Wood-Allun from *Friciana* No. 16/1963)

Section Saglionia

G. saglionis (Cels) Br. & R. A well known species which was described in 1847 and which is the pride of many collections. Specimens of 30 cms and more across always take the honours at Shows. The species is very variable even though this is generally not noticeable since only the finest forms are grown for sale. Spine colour varies from white to black but the favourites are the red spined forms. Of late Ritter has mostly been sending seed of white and pink spined sub-forms to Europe.

G. saglionis v. *longispinum* Fric. There are a few of these in this country, grown from Fric's seed. Large felty areoles and long spines are characteristic. The ribs are broken into large protuberances but plants with small protuberances are also interesting. Backeberg named a form with black spines *Brachycalycium tilcarensis*. I am not convinced that this genus is justified. *Tilcarensis* could at most be a variety of *saglionis*. If one observes the flowers of a number of *saglionis*, one can establish that the colour varies a great deal. It is usually dirty white to pink but last year one of my imports produced dark red flowers. The fruit is large and tomato red and is very juicy.

G. pflanzii (Vpl) Werd. This is very like *saglionis* and is said to reach half a meter in diameter. It can be distinguished from *saglionis* by its rather more yellowish green body colour and velvety epidermis. The spines are not so beautifully coloured and there is only one central spine compared with the several of a mature *saglionis*. *Pflanzii*'s flower is larger - some 5 cm in diameter with a throat which has a tinge of violet and a violet pistil. The plant is found in Bolivia and was very rare in this country. Only recently have imported plants started to arrive.

G. zeggarae (Cardenas). Of the new Bolivian cactus described by Prof. Cardenas in 1958, I have only *G. zeggarae* as a seedling, grown from seed collected by Ritter. The plant is very like *saglionis* but they are easily recognisable from the colour of their spines. In *saglionis* the colour is consistent along the whole length of the spine whereas *zeggarae* goes from light coloured, opaque at the base to black at the tip. My import differs from this and a seedling I got from the Rhineland is different again. *G. zeggarae* is therefore very variable.

G. lagunillasense Card., G. marquezii Card., G. riograndense Card. and G. eytianum Card. These are all new and were described in K.u.a.S. in 1958. We know them only by their description and photographs. At the present time there are no plants or seed in Europe, and I can therefore make no comments. Perhaps our wishes will eventually be granted and then we will acquire seed at least.

G. sp. Robore. Has only recently been found in Eastern Bolivia. Those imports we have received leave us in no doubt that this is a new species. They are bright green, flat plants which are said to reach 15 cm in diameter. They have one central spine and eight radial spines which are curved inwards. The flowers are said to be dark pink to carmine, tube long and blue. The fruit dark blue when ripe. We will not be able to ascertain whether the plant belongs to the saglionia group or one of the others, until later.

Comments on Section Saglionia of the Gymnocalycium

..... from H. Middleditch:

"A great many imported plants have become available recently from this group of Gymnocalycium - including two species which are not mentioned by Dr Schutz as they are of more recent date than his article. Indeed, amongst these new imports there are plants which raise some really interesting problems. In the course of discussing this situation at a local Chileans get-together various plants, slides, and descriptions of plants supposedly coming within this group were examined. Several maps of South America were consulted and Geoff Swales spent some time locating various place names which had been given in literature and nursery catalogues as discovery locations. This produced the following picture of distribution.

"*G. saglionis* is quoted by Backeberg as coming from Salta, Tucuman and Catamarca, which covers a fairly extensive part of North-western Argentina (see map Chileans No. 10 p. 12). Markus and Rausch, and also Buining, report finding this species on the Sierra Famatima in La Rioja, which extends even further the southward extent of the distribution. All the references to the occurrence of this species would seem to suggest that it is found at fairly high altitudes in the Andes, but not in the lowlands immediately to the east of the Andes.

"Coming further north we reach the border between Argentina and Bolivia and just to the north of this line, at Augusto de Villa Montes in the eastern foothills of the Andes, we have the type locality of *G. marquezii*. Just over the border on the Argentine side we have Tartagal, again in the eastern foothills of the Andes, whence comes *G. marquezii* v. *argentinense*. In his Kakteenlexikon Backeberg refers to this plant being collected by Fechsner between Tucuman and Salta, which would represent a rather remarkable overlap with the habitat of *G. saglionis*.

"Still on the Argentine-Bolivian border, but now in the Chaco lowlands east of the Andes, we find *G. pflanzii*. This was originally described as coming from South Bolivia near the Rio Pilcomayo. Later it was collected by Fechsner from the Tarija Province of Bolivia and also from the west bank of the Pilcomayo, in Argentina. Buining refers to finding it on the Bolivia-Paraguay border which is virtually the same locality.

"Returning to the Andean foothills, north from Villa Montes, we come to Boyuibe on the border between Chuquisaca and Santa Cruz provinces; here we find *G. chuquisacatum*.

"Further north in the same foothills we come to Charagua, to the east of which is found El Atajado, the type locality for *G. izozogzii*; this appears to be where the foothills are running out into the Chaco, for an altitude of 400 m (app. 1,250 ft) is quoted for this location.

"A little further to the north we find *G. eytianum*, although which "Eyti" or "Yuti" to be found on our maps is Cardena's discovery habitat, is uncertain.

"To the west of this location and at a higher altitude up on the eastern flanks of the Andes we find Lagunillas, the type locality of *G. lagunillasense*.

"Much further to the west, on hills on the edge of the Bolivian Puna, we find *G. millaresii* near the town of Millares.

"Over a hundred miles to the north, beyond the Rio Grande, we find the habitat of *G. zegarrae* near Mairana, still at high altitude.

"Further to the east, but still in the Andean heights, we have Comarapa from whence *G. comarapense* originates.

"The habitat of *G. saglionis* stretches over a distance of almost 600 miles throughout north-west Argentina. One would expect to find quite a wide range of variation in features such as spine colour, length, and form and in body habit, with such a widely ranging distribution. Backeberg goes so far as to describe the species as 'very variable' in his *Kakteenlexikon*. From the vicinity of the Bolivian border for another 400 miles to the north, we then find nine different species in this same group. Is there perhaps only as much variation between the various species in Bolivia as there is between the various forms of *G. saglionis* in Argentina - only in Argentina perhaps there is no Dr Martin Cardenas to give them different species names?

"From the geographical locations of the Bolivian species, it would appear that both *G. millaresii* and *G. zegarrae* come from much deeper within the Andean massif than any other species. Consequently it is understandable that there should be an affinity in the appearance of these two species indicated in the accompanying descriptions from the G.O.K. Bulletin. Likewise it would appear that both *G. pflanzii* and *G. izozogzii* emanate from the lower foothills of the Andes and the adjacent flat Chaco lowlands; thus these two species are also closely related by the writer in the G.O.K. Bulletin.

"The distribution of the species in the *Saglionis* section may be summarised as follows:-

From the high Andes:- *G. saglionis*, *millaresii*, *zegarrae* and *comarapense*.

From the eastern fore-ranges of the Andes:- *G. marquezii* and *lagunillasense*.

From the foothills and adjacent Chaco:- *G. pflanzii*, *chuquisacanum*, *izozogzii* and *eytianum*.

"The flowers of all these plants, with the sole exception of *G. chuquisacanum*, have been shown by description and illustration to be generally similar, that is they have a very short tube and a squat, urn-shaped flower, a dark coloured throat, the stamens inserted over most of the depth of the flower tube with the anthers standing fairly close to the tube and petals, so that the stigma is readily visible when the flower opens.

..... from T. Lavender

"My plant of *G. lagunillasense* was obtained from De Herdt during his visit to Britain in 1971. It is rather columnar in shape and the lower part of the body is pale brown in colour. In midsummer this plant put out a bud from an areole very close to the growing point. The bud had some difficulty in growing through the surrounding spines, but eventually it opened; the petals were of a peachy-pink hue. The flower was quite short and squat."

..... from C. Webb

"My plant of *G. millaresii* was obtained from Hallett - presumably a Lau collected plant. It budded in October 1970, with a bud shape rather like *G. saglionis*, the colour being a wishy-washy green with yellow edges to the sepals. The bud became angled in to the centre of the plant in the course of trying to force its way through the spines.

"With *G. saglionis* I have several plants, all of which are very similar except for spine colour which varies from pale pink to deep reddish black. Those plants which are about 8 cm in diameter have not flowered yet, but my largest plant is about 19 cm in diameter and this one did flower this year (1971). The flowers agreed closely in shape with those on the sketch by Tom Lavender but they did not grow out above the spines; the colour was palest pink with creamy

yellow stamen, stigma, and anthers. In the absence of another plant of this group in bloom at the same time, I crossed the flowers with practically everything else I could get my brush into but only obtained just the one fruit. This fruit grew up into an almost spherical shape, pinched in at the top where the floral remains soon fell off. Within two or three weeks it began to show a pinkish tinge and became a reddish-green colour. I seem to remember reading that the fruit becomes tomato red in colour before it is ripe; I must admit that I did not really believe that remark when I read it but my own fruit did grow to the shape and colour of a red tomato, splitting open and exuding the seeds in a thin jelly-like greenish liquid. The stream of tiny black seeds very gradually crept down the plant - what a job it proved to be, trying to clean the seeds and the tacky pulp off the plant!

"Not to be outdone, my *G. pflanzii* also produced a fruit which ripened to a red colour, but on this species it was a much darker colour of red than on *G. saglionis* - a deep purplish-red."

..... from R.C. Sharman

"I have plants of *G. pflanzii*, *marquezii*, *zegarrae*, *millaresii*, *lagunillasense*, *comarapense*, *eytianum* SH 944, SH 942, and *saglionis* which are all very similar in appearance. The flower on SH 944 *eytianum* was squat, urn-shaped, salmon-pink in colour - in general form and in style and stamen appearance similar to the flower on *lagunillasense*.

"Fruits have been formed on *G. pflanzii*, *marquezii*, *lagunillasense*, SH 942, *eytianum* SH 944, and *comarapense*. All the fruits are the same shape and ripening red. *Comarapense* pods ripen the colour of purple damson.

"My plant of '*eytianum*' from Uhlig flowered more from the shoulder of the body. It is a much longer flower tube than any of the others; the flower opened wide briefly over two or three days, the anthers appearing to be grey, the stigma being low in the tube. The body form is very similar to '*izozogzii*' but green and five spines per areole against three.

"The plant of *G. 'izozogzii*' from Sargent has a copper coloured body - it is not yet fully established, the spines being rather more recurved than *G. 'eytianum*'. At present it is in bud but the sun does not seem to have enough strength to open them."

..... from H. Middleditch

"I have in my collection a plant purchased from Uhlig as *Gymno. 'eytianum'* which has a dark green body, somewhat steep sided ribs joining at a sharpish peak. This does not match the type description of Cardenas and the illustration which appeared with his follow-up notes on flower characteristics in the K.u.a.S. Journal; in consequence I suspect that these plants are being distributed under an incorrect name. I have also seen a number of plants called *G. izozogzii* which also have the steep sided ribs with prominent peaked humps on each tubercle, which again does not match Cardenas's description and which I again suspect are being distributed under an incorrect name.

"There is a Lau 371 plant of "*G. izozogzii*" collected near Guanacos - a place name which appears at 60°W and 19° 30'S, not far distant from the type habitat of this plant. Lau 374 also comes listed as *G. izozogzii* from Charagua, which is the type locality of the species.

"The various foregoing observations would seem to suggest that the Lau 944 matches the Cardenas description and is correctly named, whereas the so-called "*eytianum*" of Uhlig is evidently outside this group. The question then arises, what should it be called?"

..... from H. Ewald

"On a visit to De Herdt in the Spring of 1970 I saw a large batch of *G. marquezii*, many of which were in flower. I bought two of these plants which are now in flower for me.

The flower comes from near the crown of the plant, urn-shaped with a short tube and very pale apricot pink petals, a crimson throat and a peachy pink stigma with 11 lobes that you can see quite easily when the flower opens flat. The inside petals have a deep pink midstripe on the inside and the outside petals have a brown midstripe on the outside. A fruit has formed on this plant, of about 15 mm in diameter, flattened globular in shape, with a distinctly reddish tinge. The fruit on my *G. saglionis* was of very similar shape and colour but slightly larger in size.

"Both *saglionis* and *marquezii* have broad, low, rounded ribs and upstanding curved spines which makes them look very much alike. The *G. chuquisacanam* received from de Herdt has quite different ribs, steep sided with a sharply angled hump sticking up between each areole. The flowers appeared out towards the shoulder of the plant rather than close to the centre, like *marquezii*.

"Two large plants - about 7" across - were received from de Herdt labelled *G. Sp. de Paracari* - Palos Blancos. This autumn they also bloomed, with numerous short, squat, urn-shaped white flowers projecting only a short way above the spines. The flowers appeared all over the crown of the plant between the centre and the shoulder. The ribs on these plants are very numerous, fairly narrow and steep sided but the prominent humps between areoles are perhaps not quite as sharply peaked as on *chuquisacanam*, "*eytianum*" or "*izozozii*".

"In early 1970 I obtained from de Herdt two plants labelled *G. de Eyti*; these have quite strong, radiating spines and steep sided ribs divided into sharply angled humps between each areole. The flowers on these plants were white and quite different in character from those on *marquezii*, also a little taller - perhaps 5 cm high. The tube was much longer and nearly cylindrical, dark green in colour. The scales on the tube were quite large - perhaps 3 mm wide and 2 mm high - more or less hemispherical with a little patch of red at the tip. The outermost petals had a slight point at the tip; there was a large dark green mid patch on the outside and again a small red patch at the tip. The anthers were olive green - at a quick glance one might mistake them for dark grey; the stamens covered over the top of the stigma. The fruit was tall and stout, more or less cylindrical (about 17 mm high x 6 mm broad) not pinched in at the flower remains, dark green in colour, with several large scales.

"A further pair of plants were obtained as *G. eytianum* in 1971, again from de Herdt, again with the narrow, steep-sided, sharply humped ribs, but with spines not as strong and more outstanding from the plant body. The flower was very similar to those on the plants obtained as *G. Sp. de Eyti* but the anthers did look dark grey in colour. The scales on the flower tube and fruit were equally as broad but this time only about one third of their width in height. The fruit was like an inverted bottle, with a long narrow tapering part below and also tapering to the flower remains at the top.

"Some seeds off this plant have been sent to G. Swales to find out if they are microsemineae or not. The rest of the seed has been sown and over a hundred tiny seedlings have appeared, but they are much smaller now after a few months' growth than other *Gymnos* sown at the same time.

"Also in flower this autumn were two plants received from de Herdt as *G. izozozii*. These were white flowers, coming from the shoulder of the plant and were about 5 cm high. The areoles from which they sprung faced half-outwards so that the tube was curved a little to carry the flower upright. Two fresh flowers from these plants were sectioned by H. Middleditch. The three plants have 13, 14, and 18 ribs respectively divided into very prominent steep-sided humps, the crown slightly depressed."

..... and further from H. Middleditch

"The *Gymno* "*izozozii*" in the collection of Horst Ewald had a slender whitish flower with a fairly slender tube, somewhat reminiscent of many *Muscosemineae* and quite a change from the typical squat, urn-shaped flowers of *saglionis*, *marquezii*, *pflanzii*, and so on. The flower section proved surprising in more ways than one. The ovary was long and thin but it did not start from near the base of the pericarpel - one flower had a pedicel about 10 mm long, the other a pedicel about

half that length. The main body of the stamens were inserted over a fair depth of receptacle wall up to the base of the flower petals, the filaments sweeping upwards and inwards carrying the anthers over the top of the stigma. Below the lowermost filaments of this insertion there was a gap and then - just above the nectary chamber - a single row of filaments were inserted. These filaments leant in towards and touched the style and carried their anthers just below the stigma lobes. Clearly this was a quite different form of flower construction to that of those species in the saglionia group.

"Shortly afterwards I was able to section several flowers from various Muscosemineae - *G. mihanovichii*, *anisitsii*, *mihanovitchii* v. *piraretaense* and found that these also had a single ring of stamens inserted at the base of the receptacle, with anthers below the stigma, then a gap on the walls up to the lowermost bases of the main filament insertion.

"The flowers of the so-called 'izozogzii' (ex-De Herdt) and of a cultivated *G. mihanovichii*, are shown in section in the accompanying sketches, together with a cross section of a flower typical of the *G. saglionis* group for comparison. The short, squat shape of the latter flower and the exposed stigma lobes, with the anthers stacked close to the wall of the flower tube, may be seen on any of the growing flowers of this type. Likewise, the tall, slender tube and the stamens curled over the top of the stigma can also be seen on any flowering plant of *G. mihanovichii*. When the flower is sectioned it becomes possible to see also the comparison between a slender and a stout style, between the long and the short filaments, and between the different insertions of the filaments in the wall of the receptacle. The flower cross sections thus provide rather more information for comparison purposes than do photographs of the open flower.

"All we need now is Geoff Swales to tell us whether the seed from Horst Ewald's plants of the so-called "izozogzii" are indeed Muscosemineae. It does look as though the plants distributed under this name by both Uhlig and de Herdt are not correctly named.

"The *Gymno. Sp. Paracari* - Palos Blancos also intrigued me as I was convinced it reminded me of a plant which I had seen previously. Eventually I remembered a large *G. saglionis* from Darlington which I had seen growing in a plastic bucket and then I realised that the considerable size of the plant, the flowers distributed all over the crown from the centre to the shoulder, and the flowers just protruding above the spines, were typical *saglionis* features. However, this discovery place is much further north than the accepted habitat of this species. Since there is some difference between the seed of *G. saglionis* and the various Bolivian species in this group, again an examination of the seed would prove most interesting.

"As these plants almost all flower into the autumn, they could well promote interest during the informal discussion sessions in our 1972 National Gathering".

..... from G.J. Swales

"The seed from the *Gymno. "eytianum"* of H. Ewald turned out to be Muscosemineae; this means that we must find another name for these plants. The seed appears to be remarkably similar to samples of *G. tudae* which I have received from other sources. Seed received from De Herdt, listed in his autumn 1971 catalogue as 'eytianum', 'chuquisacatum', and 'izozogzii', are all Muscosemineae, whereas correctly named plants of these species would be Microsemineae."

..... further from H. Middleditch

"It would thus appear that most of the plants and seed distributed by Uhlig and by De Herdt as "eytianum", "izozogzii", and "chuquisacatum" are incorrectly named; they are in fact a member of the Muscosemineae, probably *G. tudae*. The plants distributed under these same names but complete with Lau collecting numbers would appear to be correctly named. The plant illustrated in the U.S. Journal as *Gymno "izozogzii"* is in fact a *G. tudae*."

..... from J.D. Donald

"Without being aware of it at the time as the discussion on these plants was going on by my friends in the Chileans, I was also engaged on a similar study for the N.C. & S.S. Journal, which appeared in the December 1971 issue.

"The Gymno. sp. Robore mentioned by Dr Schutz in his article is the plant now known as *G. chiquitanum* Card. which is of course synonymous with Backeberg's *G. hammerschmidii* - the former name having priority. The seed of *G. chiquitanum* according to Schutz's latest classification belongs to the section *Mazanensia* and not to the expected section *Saglioni* but Buxbaum places it in a special section of its own as *Chiquitana*. Both flower, fruit, and seed of this plant are very different from the other Bolivian *Gymnocalyciums*, making it clearly an odd one out.

"The variations within the population of *G. saglionis* in Argentina are in fact exactly paralleled by the variations within the populations of *G. pflanzii* in Bolivia and Paraguay - if Curt Backeberg did not find it possible to describe all the variations of *G. saglionis* as new species it is indeed remarkable that Martin Cardenas managed to find botanical justification as distinct species for all the variations of *G. pflanzii*. Clearly they are isolated populations of the widely distributed *G. pflanzii*.

"It is a great pity that there was some mix-up in the collection of the plants found in Bolivia by Dr. Lau and that both *Microsemineae* and *Muscosemineae* plants were distributed under the same number, particularly those from Eyti (942 and 944) and from the Arenales de Guanacos (371). There is little doubt that the long tubed white flowered plants (*Muscosemineae*) are all forms of *G. tudae* Y. Ito (Lau 944) and the short-tubed, white with deep maroon centres flowered plants (*Microsemineae*) are either *G. izozogzii* or *G. eytianum* - the only difference is that *G. izozogzii* has a pale orange to pink-salmon outer perianth whilst *G. eytianum* has a pure white outer perianth. Mostly Lau 942 has in my experience pale orange perianth and thus are *izozogzii* rather than *eytianum*, whereas the Lau 371 (*Microsemineae* forms) have white outer perianths and hence are *eytianum*, rather than *izozogzii*. It is puzzling that 944 should also in many accounts also be associated with *Microsemineae* types rather than with *Muscosemineae*; in my experience all 942 should be the *Microsemineae* type and 944 the *Muscosemineae* type.

"Regarding the habitat of *G. eytianum*, in his note to me regarding both *G. eytianum* and *G. izozogzii*, Prof. Martin Cardenas says *eytianum* comes from the Eyti besides the Banados del Izozog in the Province Santa Cruz.

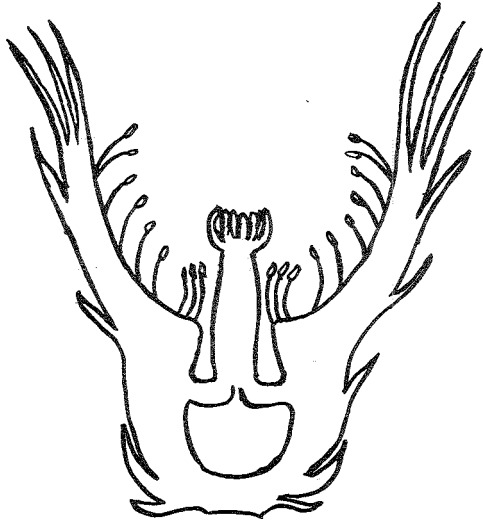
"It is odd that Horst Ewald found 397 to flower with short, squat urn-shaped flowers - all other 397 I have seen have the long-tubed white flower of the *Microsemineae* group. Obviously one must be very wary of attaching a name to a plant by reference to its number only."

* We have a few slides showing plants of this group in flower and fruit. A slide of the large red fruits on *G. saglionis* would be very welcome. - A.W.C.

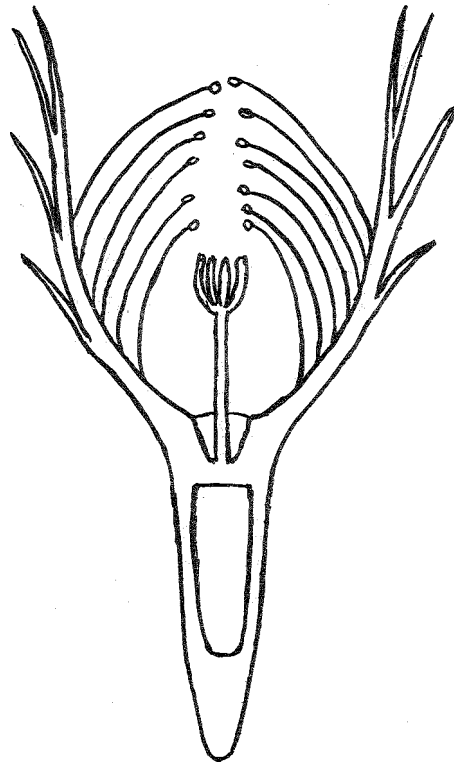
The following translations of *G. millaresii*, *chuquisacanum*, and *izozogzii*, are from the Austrian Cactus Society Bulletin, described by Peter L. Reischütz. The original diagnoses appeared in the C. & S. Jnl. (U.S.) 38:1966, the additions to the English text being placed in brackets.

Gymnocalycium millaresii Cardenas

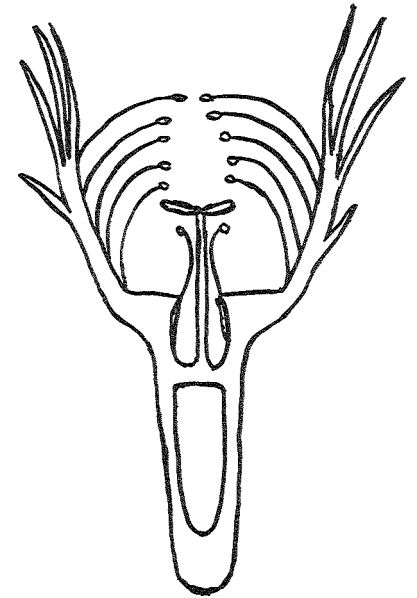
Globosa parce *complanata*, *glaucescens*, 6-8 cm alta, 12-14 cm crassa. *Costis* 16-19 in *tubercula* 6-8 mm alta 2-2.5 cm diam. *dissolutis*. *Areolis* 3 cm *remontis*, *ellipticis* 1 cm long, *nigrescente tomentosis*. *Aculeis radialibus* 7-9 *pectinatis*, *lateraliter curvatis*. *Aculeis centralibus* 1-2 *superne directis*. *Omnibus aculeis cinereis apice brunescente* 2.4 cm long.



GYMNOCALYCIUM
typical of
SAGLIONIS
LAGUNILLASENSE
MARQUEZII
PFLANZII
EYTIANUM



GYMNOCALYCIUM SPECIES
(SOLD AS G. IZOZOGZII)



GYMNOCALYCIUM
MIHANOVICHII

FLOWER CROSS SECTIONS

Floribus infundibuliformibus zygomorphic 4 cm long, 4 cm latis. Ovario globoso, 7 mm long, diluto viride lilacinis, squamis 2 x 5 mm apice rotundis praedito. Tubo 2 cm lato, squamis spathulatis diluto viridis margine lilacino instructo. Phyllis perigoni exterioribus late spathulatis 1 cm long, roseis, exteriore viridiscens. Phyllis interioribus lanceolatis 17 x 7 mm roseo salmonis a basim magentibus. Staminibus ex fundo tubi usquebasim petalis 5 mm long; filamentibus magentibus, antheris flavis. Stylo 17 mm long, coronato.

(Solitary) globular, slightly depressed, bluish green (grey-green), 6-8 cm high, 12-14 cm diam.

Ribs 16-19 (straight) divided into tubercles 6-8 mm high from 2.0-2.5 cm diameter.

Areoles 3 cm apart, elliptical, 1 cm long with blackish felt. (Areoles in crown without spines).

Radial spines 7-9, pectinate, curved sideways.

Middle spines 1-2, directed outwards.

All spines (horn-) grey with brownish tip, 2-4 cm long. (Upper spines dark brown, reddish at the base).

Flowers (from the upper part of the body) funnel-shaped, zygomorphic, 4 cm long 4 cm diameter.

Ovary spherical, 7 mm long, pale lilac-green, scales 2 x 5 mm rounded off on top (broad rounded with paler margin).

Tube 2 cm diam., with (broad-) spatulate, pale green scales with lilac margin.

Outer flower petals broad-spatulate, 1 cm long, pink, outer part greenish.

Inner flower petals lanceolate, 17 x 7 mm, salmon-pink, magenta at the base. (Throat dark magenta).

Stamens from the base of the flower tube up to the foot of the petals, 5 mm long; filaments magenta, anthers yellow.

Style 17 mm long, magenta, with 13 yellow-magenta 7 mm long stigma lobes.

Habitat Bolivia, Province Saavedra, Dept. Potosi, besides Millares, at 2,600 m. Growing in quartzite rock.

Type species in Herbarium Cardenasium April 1962 No. 2624.

(This species is similar in habit to *G. zegarrae* Card.; distinguishable from it, however, by its peculiar spination, flower colour, and its geographical distribution. It must be the highest representative of the genus in Bolivia, since the other species occur at below 2,000 m.)

Gymnocalycium chuquisacanum Cardenas

Globosa parce complanata 5-6 cm alta, 12 cm lata, cinereo viridis. Costis 13 in tubercula 1 cm alta, 1.7-2.8 cm lata dissolutis. Areolis 1.5 cm inter se distantibus, circularibus vel ellipticis 7 mm diam. cinereo vel nigrescente tomentosis. Aculeis radialibus 7-10 radiantibus vel lateraliter curvatis 2-3 cm long. Aculeo centrali uno sursum curvatis 2.5-3 cm long. Omnibus aculeis cinereis apice brunescens.

Floribus ex apice caulorum, urceolatis 6.5 cm long, 5 cm latis, parce lateraliter complanatis. Ovario globoso 12 mm diam. diluto viridis, squamis 5 mm latis, albido marginatis praedito. Tubo superne patente roseo brunescens. Phyllis perigoni exterioribus lanceolatis 22 mm long, extus viridiscens, intus roseis. Phyllis interioribus lanceolatis, acutis salmoneo roeis 20 mm long. Staminibus ex fundo tubo usque basim petalis 3 mm long, filamentibus magentibus, antheris brunescens. Stylo 11 mm long, magentibus 22 lobis stigmaticis flavis 5 mm long coronato.

Globular, slightly depressed, 5-6 cm high, 12 cm diameter, grey green.

Ribs 13 divided into (rounded) humps of 1 cm high and 1.7 to 2.8 cm diameter.

Areoles 1.5 cm apart, roundish or elliptical, 7 mm diam., grey - or black - felted.

Radial spines 7-10, radiating outwards or curved sideways, 2-3 cm long.

Central spine 1, curved upwards, 2.5 to 3 cm long.

All spines (horn-) grey with brownish tip.

Flowers (few) in crown, urn shaped 6.5 cm long, 5 cm diam., slightly flattened sideways.

Ovary globular, 12 mm diam., pale green, scales 5 mm broad, (greenish-) white margined.

Tube expanding upwards, brownish pink.

Outer flower petals lanceolate, 22 mm long (x 7 mm), outside greenish, interior pink.

Inner flower petals lanceolate, pointed, salmon-pink, 20 mm long (x 5 mm).

Stamens from the base of the tube up to the foot of the petals, 3 mm long, filaments magenta, anthers brownish.

Style 11 mm long, magenta, with 22 yellow 5 mm long stigma lobes.

(Throat magenta, glossy)

Habitat: Bolivia, Province Azero, Department Chuquisaca, at Boyuibe, 700 m.

Type species in Herbarium Cardenasium May 1958 No. 6226

(This species belongs to the species-complex *G. zegarrae* Card. and *G. lagunillasense* Card., with broad rounded tubercles and globular ovary. It is distinguished by its longer flower - 6.5 cm, which as yet will be found in no other Bolivian representative of the genus - through its pointed flower petals and their sideways flattened flowers.

It is possible that F. Ritter has published some other near related species, likewise from Boyuibe, or perhaps this self-same species, in his race for priority and without a good illustration.)

Gymnocalycium izozogzii Card.

Simplex, globosa 4-5 cm alta, 9-12 cm crassa, cinereo viridis. Costis 9-10 in tubercula sphaeroidea prominenti vel horizontaliter compressa 12-15 mm alta, 20-25 mm lata dissolutis. Areolis 1.5-2.5 cm inter se distantibus circularibus vel ellipticis 6-8 mm diam. cinereo tomentosis. Aculeis radialibus 10-11, radiantibus vel parce adpressis, 10-25 mm long, cinereis. Aculeo centrali 15 mm long.

Floribus infundibuliformibus vel urceolatis 4 cm long, 3 cm latis. Ovario globoso 7 mm long, brunescenti nitenti, squamis 3 mm latis roseis praedito. Tubo breve superne patente, brunescente, squamis 6 mm long, brunescendis margine roseo instructo. Phyllis perigoni exterioribus spathulatis 8-16 mm long, roseo salmonis intus, diluto bruneo extus. Phyllis interioribus spathulatis 20 x 7 mm, temperato salmoneis a basim magentibus. Staminibus ex fundo tubi usque basim petalis 3-5 mm long. Filamentibus gracilibus, magentibus; antheris flavo brunecentibus. Stylo 8 mm long, roseo 2-3 mm crasso, 18 lobis stig maticis diluto magentibus vel flavis 3 mm long coronato.

Solitary, globular, 4-5 cm high, 9-12 cm diam., grey-green (tinted reddish)

Ribs 9-10 divided into (rounded) hemispherical projecting or horizontally pressed-together humps from 12-15 mm high and 20 - 25 mm broad.

Areoles 1.5-2.5 cm apart, roundish or elliptical, 6-8 mm diam., grey felted.

Radial spines 10-11, radiating outwards to slightly adpressed, 10-25 mm long, grey (horn coloured).

Central spine 15 mm long.

Flower funnel or urn-shaped, 4 cm long, 3 cm diam.

Ovary globular, 7 mm long, brownish glossy, with 3 mm broad, pink scales.

Flower tube short, broadening out above, brownish (glossy) with 6 mm long, brownish pink-margined scales.

Outer flower petals spatulate, 8-16 mm long, salmon-pink inside, exterior pale brown.

Inner flower petals spatulate, 20 x 7 mm, pale salmon-pink, magenta at the base.

Stamens from the base of the flower tube up to the foot of the petals, 3-5 mm long; filaments thin, magenta.

Anthers yellow-brownish.

Style 8 mm long, pink, 2-3 mm thick, with 18 pale magenta to yellow 3 mm long stigma lobes (stigma lobes outside pale magenta to pink, yellow on inside.)

(Throat red.)

Habitat: Bolivia, Province Cordillera, Dept. Santa Cruz, (Izozog basin) at El Atajado, 400 m. (Grows in fringes of thornbushes in loose, sandy soil).

Type species in Herbarium Cardenasium April 1965 No. 2625

(This species seems to be related to *G. pflanzii* (Vpl) Werd., which were collected by Pflanz from the banks of the Rio Pilcomayo. It is distinguished therefrom by the adpressed and shorter spines, the flower colour, and the more northerly habitat.)

PHOTOGRAPHING AND PRESERVING SECTIONS OF CACTUS FLOWERS by Mrs. J.M. Hobart

It is not very long ago since I purchased a single lens reflex camera as a replacement for one which had an indirect view finder. A set of extension tubes were soon added and this led to my taking close-up views of flowers, especially of *Notocactus* blooms. Discussions at the local Chileans get-together over these slides and Buxbaum's *Notocactus* flower sections, coupled with seeing some other attempts at preserving sectioned flowers, led me to try and see what I could do myself with sectioning and preserving cactus flowers.

In order to examine the different arrangements of stamens etc. in a flower, a longitudinal section is required. It is best to cut through the flower with a scalpel blade or a one-sided razor blade. One must first cut the flower from the plant, place it on a firm surface and then cut fairly quickly from the ovary to the base of the petals. Ideally the style should be sectioned in two halves, but if this is done with *Notocacti*, however, the style immediately bends upwards; this makes it impossible to photograph the section satisfactorily since the style is foreshortened and blurred because it is outside the depth of field of the camera. Therefore it is better to adjust the cut so that one section includes all the style and then use this section for photographing and subsequently pressing. Any stigma lobe out of alignment can be cut off.

A single-lens reflex camera is ideal for photographing the sections, with one or more tubes in use so that the flower section fills the frame. A short-length tripod is best to steady the camera which may be focussed from above; by doing this in the late afternoon the sunlight will be at a low angle and this will bring up the contrasting features of the sectioned flowers.

It is then logical to press the flower section for future reference. This should be done at once, after photographing, between blotting paper and under heavy weights. When the section is dry - and this may take some weeks if the parts are juicy - it can be mounted on plain white stiff card and covered with transparent fablon or contact. Care should be taken to get rid of the static electricity from the transparent cover after stripping off the backing and before sticking the plastic over the flower sections. I suffered one disaster when preparing to place the plastic on to one flower - the piece of plastic must have been all of two or three inches above the flower which suddenly jumped up due to the static electricity and attached itself firmly and mis-shapenly to the self-adhesive coating.

The two half-sections can be placed on the card so that one displays the interior and the other displays the exterior of the flower. I have found that this method will preserve the flower section without any apparent deterioration, particularly without any mould growth appearing on the flowers. Of course the colours fade and for this reason I find photographing them a more rewarding method of recoding their structure.

Comments on recording flower sections

..... from H. Middleditch

"The "some other attempts" referred to above were made by me; the results could hardly be described as successful. The most serious problem was the development of fungus spores from the pollen whilst the specimen was being pressed. Quite apart from this adversely affecting the appearance of the specimen, the fungus-affected parts often adhered strongly to the face of the blotting paper which damaged some parts of the filaments etc. in separating the specimen from its press.

"To store the specimens, purpose-made cellophane envelopes were cut out, folded, and sealed with sellotape. However, these are not convenient to either store or handle and the method described by the author, above, would appear to be preferable."

..... from G. Hedgecock

"Having seen the sectioned flowers pressed by H. Middleditch which have suffered from fungus growth, I have looked for information on fungicides which might be of use in preserving cactus flowers. I have found a good deal in my literature about preservation of textiles, paper and wood - which might be relevant to this problem - but little about preserving botanical specimens. I suppose that the ideal would be a solution which could be sprayed on to the flower before it is removed from the plant, or on to the flower after it has been cut, then allowed to dry before pressing. A small plastic bottle such as the ones sold by Woolworths or Boots for hair lacquer refills might be suitable for this purpose. An alternative would be to soak the blotting paper in the preservative and allow it to dry before folding over the flower to be pressed.

"The best and most easily obtained fungicides of the phenolic type are:- Salicylanilide; Pentachlorophenol; Ortho-phenylphenol. The recommended application for textiles is 0.1% by weight. At this dilution they are colourless and not too toxic to the user.

"Heavy metal compounds are also toxic to bacterial and fungal growth. Copper naphthenate is the most popular but is deeply coloured. Zinc naphthenate is colourless and almost as effective at a concentration of about 0.5% by weight. Mercury compounds are rather dangerous and are best avoided.

"Needless to say, all proper precautions should be observed in the storage and use of these chemicals."

..... from J. Hopkins

"I have also sectioned a few cactus flowers and photographed the outside and inside of the cut flower. I agree with Mrs. Hobart's comments about problems with the curvature of the style. Another problem which I encountered was with a wide open flower of a Notocactus which started to close in quite rapidly to such an extent that by the time I had sectioned it and had it ready for photographing, it was half closed.

"I find that it is useful to include a scale in the photograph and I now do this by using a black paper background with two axes at right angles, these being divided up into 10 mm gradations with white ink. The two flower sections are then positioned such that the gradations lie along the edge of the photograph."

(Our contributor has added three slides of sectioned flowers to the slide library - A.W.C.)

Any examples of pressed flower sections would be very welcome for display and discussion at our Autumn Gathering.

NEOCHILENIA WOUTERSIANA FLOWERS by J.W. Welsh

Some time ago I obtained a plant labelled *Delaetia woutersiana*, which I was very pleased to acquire as I believe that it is fairly rare. I was therefore particularly pleased when it began to show signs of coming into flower. The buds began to appear when it started into growth in Spring, and opened for me in early June.

The petals are a light pink with a darker midrib. The innermost petals are paler with a less well defined midrib. There appears to be two rows of petals; these two rows are not clearly distinguishable but this is the impression gained from the longitudinal section. When viewed from above the petals appear to be considerably more crowded than could be accounted for by two rows. The petals open fully to show the mass of yellow anthers on white filaments - the pollen is also yellow. The stigma is visible above the level of the anthers; the eight or nine lobes do not open out. The stigma lobes are pale pink, the style darker pink, corresponding to the lighter and darker petal colours.

There is some light brown fluffy wool round the ovary, which appears to have a greenish epidermis (or pericarpel - H.M.). There are small black scales visible through the fluff.

Above the ovary the tube is a yellowish green colour with scales arranged spirally. The upper scales are accompanied by a bristle which has its origin near that of the scale and concealed by it so that the bristle emerges from beneath the scale and continues for up to two or three times the length of the scale. Under a X 20 lens the bristles can be seen in some cases to have a rough tip, the roughness consisting of short pointed protrusions. The bristles are black. They are hard and bend double before they snap but they do not break off clean, suggesting that they are not as completely dried out as the spines. Occasionally there are two bristles from one scale.

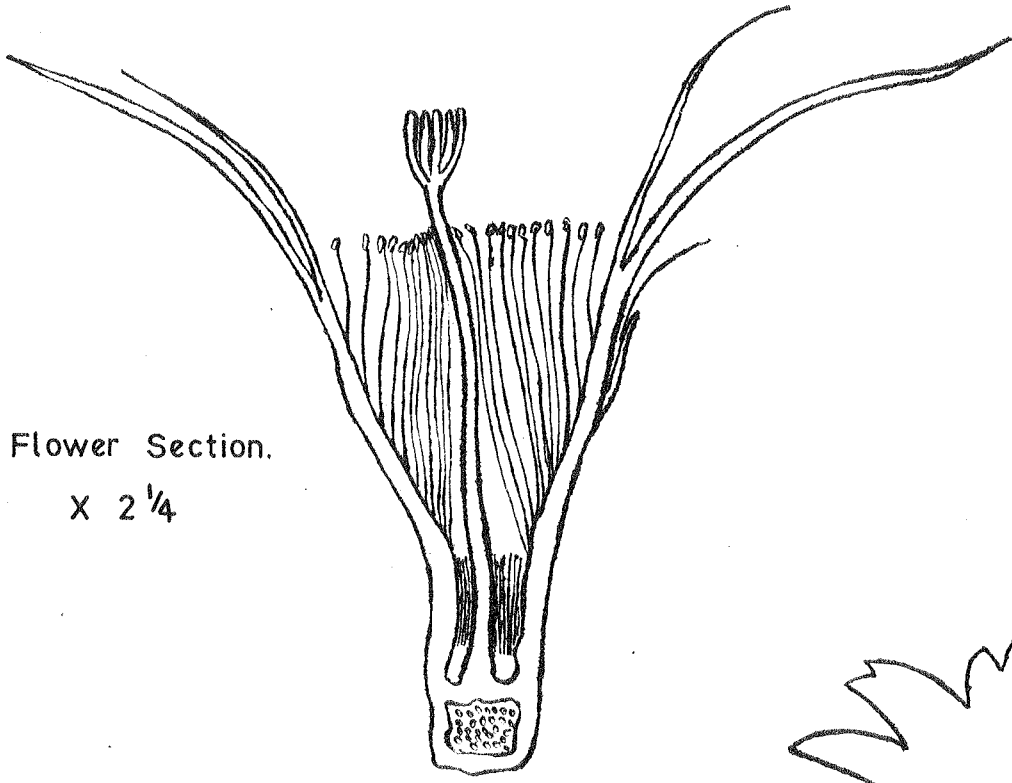
The scales have a dark brown to black tip, a reddish zone about mid-height and a greenish zone below that - reminiscent of the colour zones seen on the growing spines of some plants e.g. *Trichocereus fulvilanus*. The largest scales tend to phase into petals. On the more petal-like scales the reddish part is pinker, the dark tip smaller. A minute dark tip can be seen on the petals.

At the base of the receptacle there is an open nectary chamber and above it the tube is more or less parallel for a short length, with the walls grooved or striated. These grooves appear to be almost continuations of the lowermost filaments but they cannot be detached from the wall of the tube. There is a narrow light yellow band between the nectary and the grooved part of the tube. The tube above the grooved section is more or less funnel-shaped with filaments inserted over the full height from just above the grooved part to where the tube breaks into petals. The majority of the filaments, however, are inserted in the lower half of the tube.

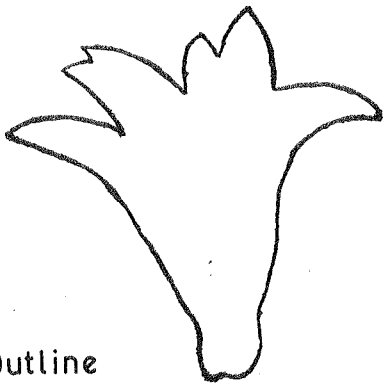
DELAETIA WOUTERSIANA Backeberg

(Translated by R. Moreton from *Die Cactaceae* Vol VI)

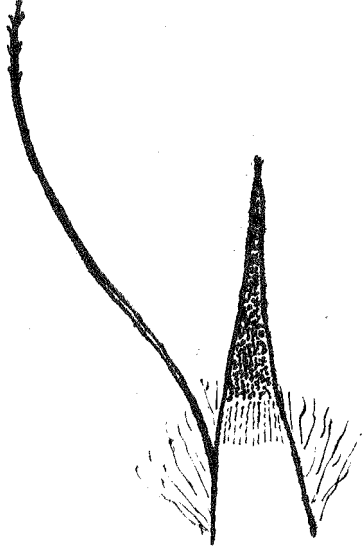
Spherical, light grey-green plants with finely dotted epidermis and strong, roundish tubercled ribs, approx. 13 in number; areoles rather large, roundish, white felted; spines round, acicular mostly $4 \pm$ slightly curved, the lowest 10-15 mm long, the upper 20-25 mm long, greyish black with darker crossbands; flower approx 20 mm long; tube missing or with the pericarp only slightly up-curved; ovary elongated-spherical, in the upper part slightly ribbed lengthways; scales very small, whitish green, adpressed elongated-pointed, in the axils only moderately strong upright tufts of hair; perianth segments very narrow, approx. 1.5-1.8 mm wide, strongly reflexed, the lowermost more greenish and shortest, the next ones rather longer, the innermost 8 mm long at the most, light-brownish to orange-yellow and in immature state all pale green below, above becoming \pm reddish and at times somewhat twisted; stamens: only sterile, thin hairlike, numerous and tightly compressed, seen i.e. the flower is (like *Gymnocalycium leeanum*, for example)



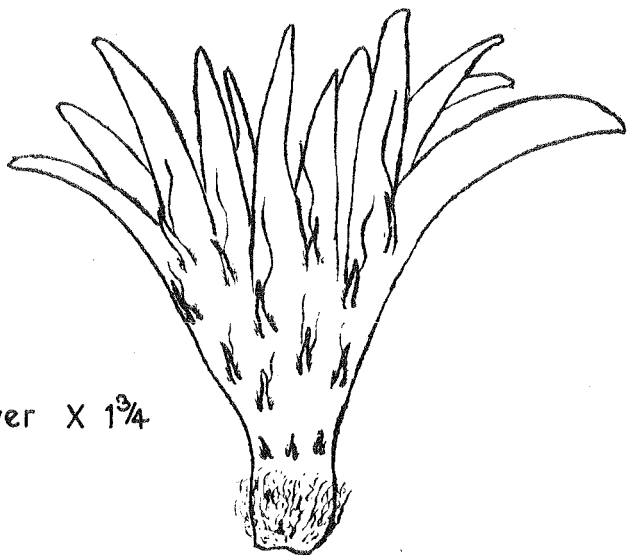
Flower Section.
X 2 1/4



Flower Outline
Actual size.



One Scale
X 10



Flower X 1 3/4

NEOCHILENIA WOUTERSIANA.

Collection — J.W. Welch

probably dioecious; stigma approx. 10 mm long, with long thin lobes; between the outermost perianth segments are a few light brown upright bristles; nectary greenish, very shallow, with a few stamen-bases inserted in the upper part, the remainder placed in a ring and attached to the inside of the tube above; ovary of sterile fruit 6 mm high 8 mm wide, the lower 4 mm empty, the funiculae in the upper part in a little carpel sack, this being pale and thin skinned; fruit evidently basal opening.

This flower can remain open for up to 14 days. Seedlings have 6-10 spines in every areole, which are however later reduced to 4.

The diagnosis of the genus contains only the most important differentiating characteristics; particulars regarding the little carpel sack were not followed up since it was not established if this was something (as with *Islaya*) which other species - if there should be any found - lacked. The plant came from an early import by De Laet from Chile, so an exact type locality cannot be given; the interesting characteristic of the long lasting exceptionally narrow petalled, apparently dioecious, flowers, the female with thickly compressed hairlike stamens, demands its own generic status since it cannot be placed in any other genus. An apical cushion of wool is lacking. The first future investigation could be to establish which Chilean genus is most closely related to this species.

The description is from the original material from A.M. Wouters (Holland) and from his details. The species was named after him since I am much indebted to him for his careful observations of Chilean material. The genus itself was named after F. de Laet, the Belgian grower, for whose large scale imports the cactus enthusiasts of his day were extremely grateful.

Comments on *Delaetia woutersiana* and *Neochilenia woutersiana*

..... from H. Middleditch

"The description of this plant given by Backeberg in his *Kakteenlexikon* suggests that the dioecious flower is regarded as one of the major factors differentiating this plant from the remainder of the *Neoporteriae*. The description of the flower on J.W. Welch's plant refers to pollen on the stamens, which would indicate that this was a male flower - but there is no suggestion that the stigma was thin, weak, or atrophied.

"Backeberg refers to the filaments being densely packed together in the receptacle, but he does not state whether the stamens fill the receptacle or whether they are packed closely together in the usual manner - around the style. The illustrations of *Pyrrhocactus tuberculatus* (Plate CXXXVIII) and *aspillagai* (Plate CXXXIX) in Vol. III of Lamb's *Illustrated Reference* show a typical bunching of stamens round the style, as do the illustrations of *Neochilenia atra* (Abb. 252) and *N. carneiflora* (Abb. 254) in Backeberg's *Kakteenlexikon*.

"These illustrations remind me that in 1970 I had a look in my greenhouse one day and found that half a dozen *Neochilenia* had just opened their flowers; after pottering round these for a few minutes it suddenly became obvious that almost all the flowers had the stamens neatly bundled round the styles, just like bunches of daffodils tied together. This led me to take some notes and I see that on that day *Neochilenia paucicostata*, *fulva*, *nigriscoparia*, *esmeraldana*, *robustus*, N.17, and sp. Buining all had their stamens bunched closely round the style. Very fortunately I happened to pay another visit to the greenhouse a day or two later and luckily my eye caught one of these flowers, to see that the stamens were no longer neatly bunched but were now spread out over the receptacle. This caused me to go round the rest of the open flowers, when I discovered that the stamens had opened out loosely over the open receptacle on each of the other species, where they had previously been bunched up. It did not take many more observations to discover that this was pretty general amongst the *Neoporteriae* - and a little thought made it quite understandable; before the bud actually opens the stamens must be bunched closely round the style since that is the only space available for them to stand. Presumably the petals (floral leaves) open outwards rather

more rapidly than the stamens, so that when the flower is seen shortly after opening the stamens are still in the position which they occupied before the bud opened. One wonders whether Backeberg would have seen the stamens open out loosely from the tight bunch he observed, if he had gone back a day later to examine his original *Delaetia*.

"The sketch from J.W. Welch depicts the long bristles in the axils of the scales at the upper part of the tube, to which Backeberg refers in his diagnosis. However, one may see the same feature of shortish bristles at the lower part of the tube and long bristles at the top, in Fig. 261 of Buxbaum's *Morphology of Cacti*, illustrating a *Neochilenia ebenacantha*. It may also be observed on other *Neochilenia* flowers.

"In the pages of *The Chileans* we have included articles by collectors who are critical of the practice of European growers naming plants from cultivated specimens, especially so when this is done on the basis of morphological differences which might appear in habitat on plants growing together in the same population-group. Dr. Priesnitz (and others) have also been critical in print of Backeberg's habit of producing a new name to suit one plant he happens to have found in a European collection. All the foregoing leads one to wonder whether perhaps the plant Backeberg used as the basis for his description was only a sport in regard to the dioecious flower and whether, in consequence, the name *Delaetia woutersiana* has any real significance.

"However, the plant does exist in various collections and it could be an advantage to retain the use of the name, if only to be able to distinguish this plant from *Neochilenia woutersiana*. I am personally very interested by the striations above the nectary referred to by J.W. Welch, as I am not able to find any other reference in literature to this feature in the *Neoporteriae*; I can see I shall be busy sectioning a number of flowers from my *Neoporteriae* this season to try and find evidence of this particular characteristic."

..... from E.W. Bentley

"I had a most successful trip to Holland. The most exciting part of the trip was the visit to Wouters. We understood him to say that there is a very rare *Neochilenia woutersiana* and a *Delaetia woutersiana*. He added that although Backeberg was his friend he (Wouters) did not believe that the *Delaetia* should be a separate genus. I got the impression that Backeberg walked into Wouter's greenhouse, looked at the plant, set up a new genus named after De Laet and called the species after Wouters."

..... from J.D. Donald

"The sketch from Mr. Welch does not depict *Delaetia* at all - I suspect that the plant he has is "*Neoporteria*" A.W. III also known as "*Neoporteria woutersiana*". The latter is not particularly rare but is an interesting plant because it combines in its flower characteristic elements of 3 sections of "*Neoporteria*", e.g. the flower colour of *Neoporteria*, pale rose; the shape of *Horridocactus*, wide tubed; the pilose scale axils of *Nichelia* (*Neochilenia*). Its origins though are doubtful - it was first discovered in the collection of Mr. Wouters (like *Delaetia*) but with no data. Seed and plants were freely distributed by John Gjeltna, David Whiteley and Dodonaeus. The resulting progeny differ amongst themselves to suggest that the parent could have been a hybrid.

"I have an original plant, a grafted cutting as well as a grafted genuine *Delaetia*, both from Mr. Wouters. The two plants are very different in appearance. A.W. III is globular to short cylindrical, dark green epidermis and straight spines black or yellow up to 10 mm long. *Delaetia* is a flattened plant, with a grass green epidermis and curved black or yellow spines. The flower of the latter is buried in the areole and shows virtually no tube at all, the yellow perianth segments are very narrow and short. The filaments appear to lack pollen and the style is rudimentary. However it readily forms fruits with any pollen from *Neoporteria* - but in my experience all the fruits are sterile.

"The illustration in Die Kakteen VI p. 3789 is exactly as my plant. *Delaetia* is probably a freak and not a genuine new species, but nevertheless I must say that A. Lau did collect in Chile a plant that looked remarkably like *Delaetia* but it died before flowering."

..... from D.W. Whiteley

"There seems to have been a great deal of confusion surrounding the plant that Curt Backeberg described as "*Delaetia woutersiana*" in Die Cactaceae VI: 3788, in 1962, not least the mistaken idea that the plant circulated around European collections as "A.W. III" or sometimes "*Neochilenia woutersiana*" is in fact *Delaetia woutersiana* or even a "*Delaetia*" at all.

"The genus "*Delaetia*" is really best forgotten (though of course now it has been published it must remain in any official synonymy), as it is at best a very dubious genus, let alone its one and only species "*woutersiana*". I was rather surprised when Donald and Rowley made the new combination "*Neoporteria woutersiana*" for it in Cactus and Succulent Journal G.B. 3, August 1966: as I know that John Donald was rather dubious about this plant. I assume therefore in view of its hazy background that as they could not conclusively prove it was not a good genus or species and as it had now been officially published as *Delaetia* they could not just ignore it. Personally I think they would have been better to have mentioned the uncertainty that surrounded this genus and species, left it where it was in *Delaetia* and not added yet another superfluous name to it.

"The plant described as *Delaetia woutersiana* is most probably some kind of freak or malformed plant, not really monstrose in the normally accepted form of that term (i.e. offsetting at every areole or the growing point repeatedly dividing) but possibly a genetically malformed plant. I understand from speaking to Mr. De Herdt when he was over here for his talk to Lincoln Branch N.C.S.S. that he is of the opinion that "*Delaetia woutersiana*" is simply a malformed form of "*Nichelia* (*Neochilenia*) *paucicostata*"! No doubt we have all had seedlings come up that have produced abnormal flowers, sometimes just their first ones are affected this way, sometimes all are always so deformed. Missing stigma lobes or sterile filaments minus their anthers are not all that uncommon in cactus plants but we all do not jump to the conclusion that the plant carries only male or female flowers because of it, but accept it for the freak it is, particularly since no other plants of it are known in cultivation from different sources. John Donald told me a while ago that as he put it, "Mr. Wouters tells me that the peculiar flower form, only female, is a dominant character and that he has made several hybrids with *Islaya*, *Nichelia*, and *Thelocephala* and that those that have flowered all possess the same monoecious reduced flower. He discounts it as a new genus and says that Backeberg has made a nonsense of it all!"

"There should be no confusion whatever between A.W. III and *Delaetia* as anybody who has seen the photographs of *Delaetia* in Die Cactaceae or Das Kakteenlexikon cannot confuse both these plants even out of flower and certainly not when they are in bloom. A.W. III has large pink wide open flowers approx. 45 mm long by 50 mm broad as shown in Mr. Welch's drawings, whereas *Delaetia* has small, almost/or sessile flowers about 20 mm long and very narrow perianth segments and somewhat contorted. The flower is a peculiar brownish-orange-yellow in colour. The plant therefore that most collectors have under the name "*Delaetia woutersiana*" is in fact A.W. III which has gone around under various guises, the most common being "*Neochilenia woutersiana*" which seems to have become muddled with "*Delaetia woutersiana*", quite a different plant altogether. No legitimate name yet exists for A.W. III as far as I am aware and collectors would be well advised to just stick to the number, however much some of them seem to abhor growing plants just under numbers, as it saves a lot of confusion in the long run. If everybody had only used the number instead of the epithet "*woutersiana*" being applied without valid publication this confusion between it and *Delaetia* would never have arisen.

"A.W. III. This plant is certainly one of the most beautiful and rewarding of all the *Neoporterias* (sensu D. & R.) having large, wide opening pink flowers and a dark green body with jet black spines. A reasonable sized plant with a dozen flowers open at once is quite a sight to

behold and would certainly endear most people to Neopterias for life (or am I biased?). According to John Donald, Wouters says of this plant "A.W. III is not a hybrid but an unnamed seedling raised by me from imported Ritter seed". He says also that "It is probably a Neopteria and one of the missing links between Neopteria sensu stricto and Nichelia, of which several are now known". I was given a very small grafted seedling some years ago by Eddie Barnes which I believe was supposed to be either *N. napina* or *odierii* from Ritters seed. This was again grafted and proved not to be what it was supposed to be but it appeared that we had obtained another A.W. III. It was a very great surprise therefore when it flowered yellow instead of the pink of A.W. III. The plant and its flower have great similarities to A.W. III apart from its colour and are obviously closely related so we may yet have another nice plant of this very interesting section. I would be interested to hear of anybody else who has raised any unusual forms, polymorphs or unknown, possibly new, species from collected seed. Mr De Herdt tells me that in his opinion *Neochilenia carneoflora* is simply a pink flowered polymorph of either *N. aerocarpa* or its var. *fulva* as the plant of Killians described in Backeberg was obtained from him and raised by him among seedlings of *aerocarpa* or *fulva* from Ritter.

"I will give a rough description of my A.W. III here for identification purposes and comparison with the translated Backeberg description of "*Delaetia woutersiana*".

A.W. III

- Body: Grafted plant:- 90 mm high (not including stock) 75 mm broad, dark green, purple tinged in full sun at certain times of year.
- Ribs: 15, notched into tubercles with a hatchet like rostrum below.
- Areoles: Oval, with white wool, 6 mm long, 4 mm broad.
- Spines: Acicular black, radials radiating, lateral radials longest, up to 13 mm long, about 10 main radials and 3-5 extra thin ones at top of areoles. Centrals 1 so far, same as radials, up to 18 mm long, all spines turn chalky grey in extreme age and are red at base in extreme youth when still growing.
- Flower: 45 mm long, 50 mm broad, pink.
- Ovary: Green, covered with fawn wool, and short black bristles in scale axils.
- Tube: Yellow-green with larger scales, having one or two black bristles and a little wool in the axils, longest bristles up to 10 mm long and slightly flattened in section.
- Petals: Broad, lanceolate, with a deep pink median line and paler margins, (in the case of my plant arranged in 3 rows rather than the two shown by Mr. Welch's drawing) inner ones paler and flower fades as it ages.
- Tube Very thick at base, stamens attached in one group from about 3 mm up from base of
- Walls: nectary to about 2 mm down from limb, attached over about 6 mm of tube surface altogether.
- Stamens: \pm 11 mm long, white with a very faint pink tinge above, anthers yellow.
- Style: 23 mm long, deep pink, lobes 8, clenched a sort of deep to brownish pink below shading to yellow-white above.
- Fruit: Typical of genus, red with scales etc. as per ovary, elongating at maturity, bottom of fruit deteriorating and eventually falling off, thus releasing seeds out of hole in base.
- Seeds: Typical, black.

..... from H. Middleditch

"On our 1971 Cactus Tour we were fortunate enough to come across a single plant of *Delaetia woutersiana* in flower. On first seeing this particular plant, I did not recognise it, but merely wondered at the most peculiar looking flower. One tended to get the impression that the flower was mal-formed. The petals were extraordinarily narrow - perhaps little more than 1 mm wide, quite out of proportion in both height and width to the receptacle. The filaments tapered to a miserable looking tip, apparently without proper anthers, looking even sorer than those on female flowering Uruguayan *Gymnos*. As a result of seeing this plant I now realise that the

illustration Abb. 80 in Backeberg's Kakteenlexikon does indeed show a few fully opened flowers of this species, not just 'starter' buds as I had previously thought."

We have a slide of *N. woutersiana* in flower: a slide of *Delaelia woutersiana* in flower would be very welcome. - A.W.C.

TREATMENT OF IMPORTED PLANTS

..... from E.W. Barnes

"Recently I received a parcel of about 30 plants from Dr. Lau in Bolivia, including *Frailea uhligiana*, *Sulcorebutia markusii* and an un-named *Sulcorebutia*; although they came by air they were very dry but a 24 hour soak in water caused the *Sulcos* to make new root and, most surprising of all, to push out buds - as many as eight from a 30 mm diameter plant!"

..... from Mrs. J. Hobart

"I give a tepid soak to imports in a bucket for about 2 to 3 hours. I always inspect carefully for dead or damaged roots and cut back where required. If all the roots are cut back I think that it is important not to dry the cut surface too long. If it is too hard the new roots cannot penetrate. I dust the underside of the plant well with a hormone rooting powder containing a fungicide and pot up into a compost which consists of about 75% of coarse sand. I keep the plant in the shade and spray frequently with tepid water, especially in hot weather.

"If the plants are potted up individually, I tie a polythene strip in a cross round the top of the plant and under the pot, to anchor it. I have been known to knock off the one root that has grown, in my overcrowded greenhouse! I keep an eye on the centre of the plant and as soon as growth is evident I move it to a lighter situation before the plant has time to become drawn. During summer, no extra heat is provided but in autumn and winter I find the top of the TV an excellent source of bottom heat. By feeding the plant with liquid fertiliser, there is no need to move the plants for a year with the risk of breaking new roots.

"A number of plants together in a deep box seem to me to be easier to manage. I am bringing on a batch of imports in a common tray at the moment. A common English weed - one of the umbelliferae - has appeared growing alongside the cacti; I suppose it was introduced in the soil which I used to make up the compost. When this weed wilts I know that the tray requires watering again - it is a very useful and effective moisture indicator."

..... from P.G. Waterman

"I picked up a *Melocactus* HU 239 from Clive Innes in May 1970. It was nearly 5" in diameter and quite without roots. I put it on a 5" half-filled pan with compost and after three days I started to give it a spraying with warm water each morning. This was continued for a month and only then was the soil watered. The pot was positioned on the staging immediately above the paraffin heater, which was still kept on all through the summer, with the ventilator open, mainly to give the extra warmth to this (and other) plants being established. By rocking the plant in its pot it seemed to take about a month to root.

"In September the plant was repotted and it was found that the plant had pushed itself up off the soil level with the new roots. The pan was found to be almost completely full of new roots and the plant was transferred to a 6" pot in order to accommodate the root system."

..... from A. Appleby

"With some imported plants one finds that all the recognized orthodox methods of encouraging the development of roots are unavailing, perhaps due to the plant being terribly dried up or with having a very tough skin. If the plant is so hardened that it proves unable to take in water, I have found that it is possible to regenerate a plant by injecting water directly into the plant body by means of a hypodermic needle. The needle must be entered into the cellular tissue between the epidermis and the vascular bundles: if gentle pressure is then applied to the syringe the water can be injected directly into the plant cells - when water starts to spray or drip back round the needle, then sufficient water will have been injected.

"Any flaccid plant which does not seem to be growing well can be treated in just the same manner: when a plant is flaccid, it means that the cell walls are partially collapsed and so the cells reduce in volume and may be partially occupied with air. The injection refills the cells with water and displaces any air, passing from one cell to another through the cell walls by osmosis. With some plants it is possible to observe the gradual spread of the water through the tissue as the cells become turgid, at an increasing distance around the point of the needle. The plant appears to become much greener quite rapidly after a water injection especially so where the cuticle is thin as in *Nopalea coccinifera*.

"The first time I put this system to use was on a batch of about thirty plants which were very dry and shrunken; none of them were anything special. I did not use water which had been sterilised in any way - in fact it was straight out of a container in the greenhouse which contained a little algae and probably all sorts of other things as well. All of the plants progressed very well after having their injection - two were lost about three or four months later but this may have been due to any one of many other causes.

"After describing this process to a meeting of a local Cactus Society in March, I was told (a month or two later) by one or two members that they had tried this method out on a number of plants that had been in poor condition and that they, too, had seen a marked improvement in the plants' condition."

THE GENUS COLEOCEPHALOCEREUS Backbg

The generic name *Coleocephalocereus* was first published by Backeberg in his "Blatter für Kakteenforschung" in 1938, but it is doubtful whether, until quite recently, there would be more than a handful of collectors in this country who would be conversant with any plants of this genus. This situation has now been radically altered as a fairly large number of plants have become available through normal commercial channels as a result of the collecting activities of Messrs. Horst and Buining in the states of Bahia and Minas Gerais in eastern Brazil. Nowadays, examples of one or two species of this genus may be found in a surprising number of collections.

Like the majority of Brazilian cephalium-bearing cacti, plants of this genus have virtually naked flowers with no visible wool or bristles in the axils of the flower tubes; they also have a cephalium containing both fine woolly hairs and some bristles. On account of these features, the early division of South American cephalium-bearing cacti was:-

1. *Melocactus* Link & Otto, with a terminal cephalium.
2. *Espostoa* (H.B.K.) Br. & R., with a side cephalium of bristles and coarse hairs, together with flowers having wool and hairs growing from the axils of the scales on the flowers.
3. *Cephalocereus* Pfeiffer, with a cephalium of fine wool and bristles or a pseudocephalium of fine wool, together with a naked flower.

The South American species which were originally to be found under the name generic of *Cephalocereus* Pfeiffer, together with later discoveries, will nowadays usually be found under the generic names of:-

- a. *Facheiroa* Br. & R. for a Brazilian cephalium-bearing cereiform plant having flowers with hairs in the axils of the flower scales i.e. similar to *Espostoa*, *Thrixanthocereus* and *Vatricania* - all from the Andes.
- b. *Pilosocereus* Byl. & Row. for those cereiform plants which exhibit a greater or lesser amount of extra-long hairy wool on the flower-bearing areoles, the areoles growing normally on ribs which are not depressed or sunken into a groove.
- c. *Coleocephalocereus*, *Buiningia*, *Austrocephalocereus*, or *Micranthocereus*, for the plants from eastern Brazil having a side cephalium of fine wool and bristles, together with a naked flower.

In general terms, these last four genera cannot be readily separated by marked differences in external features of body or flower, but two characteristics separate *Coleocephalocereus*: the seed is similar to *Discocactus* and *Melocactus* in having the hilum set square to the body of the seed, the seed being more or less symmetrical when viewed sideways (*Micranthocereus* and *Austrocephalocereus* have curved seeds) and also the flowers appear from a patch of the cephalium near the top of the plant.

The species of *Coleocephalocereus* most commonly available via commercial sources - and thus most often seen in collections - are the low growing *C. aureus* and *C. brevicylindricus*, but the genus also contains cereiform species. The columnar species have flowers from about 40 mm to about 70 mm long; these flowers have petals which open either as far as a funnel shape or with the upper section of the petals reflexed and fully open, so giving the appearance of a rotate flower. The fruit is elongated globular in shape and the seeds are either squat (about as tall as broad), or more elongated. The low-growing species of *Coleocephalocereus* have smaller flowers, some 15 mm to 25 mm long, as can be seen from the accompanying illustration of a plant in flower taken in the collection of W. Andreae, the flower is more or less cylindrical with just the tips of the outer petals reflexed. The fruit is more top-shaped (turbiniiform) and the seeds are squat, being about as high as they are broad.

Clearly the characteristic features of this genus cover a wide range, the low-growing species having flowers, fruit, and seed more nearly akin to those of *Melocactus* than do the columnar species.

Although many of Backeberg's generic names have been hotly contested by other writers, on the grounds that insignificant or unimportant features have been used for diagnosis, this particular genus has received the approbation of Buxbaum, Ritter, and Buining, amongst others. The original description of the genus *Coleocephalocereus* by Backeberg ran as follows:

"Floribus late-campanulate, glabris, nudis, ex partibus recentissimis cephalii fisso-canaliculati orientibus fructus operculato, glaberrimo, laete colorato, acuto-ovato".

In the Krainz-Buxbaum Journal "Die Kakteen" we find Buxbaum commenting upon this diagnosis that "As all true cephalium will originate from \pm depressed ribs, and thence be \pm "sunken", this feature cannot be utilised as a generic characteristic. As all species examined so far have \pm funnel shaped and not "broad bell-shaped" flowers, this diagnosis is erroneous. On account of the reference to the easily identifiable type species, the genus is undoubtedly soundly established and must therefore be preserved by a corrected and completed diagnosis".

A glance at the accompanying sketch of a flower of *Coleocephalocereus fluminensis* - the only known species at the time Backeberg established the genus in 1936 - may suggest where Backeberg acquired the phrase "broad bell-shaped flower". The almost cylindrical flower on *C. brevicylindricus* may be seen in the accompanying illustration, whilst the sketch of the flower of *C. goebelianus* exhibits characteristics intermediate between the other two. This affords support

to the views of Buxbaum, quoted above, that the original generic description is in need of revision: he provides a revised diagnosis as follows:

Coleocephalocereus Backeberg emend Buxbaum & Buining.

Cactaceae columnares erectae simplices (rarissime paulum ramosae) usque ad 5 m altae et 15 cm diam., vel prostratus usque ad 2 m longis. Costis 12-34, in speciebus prostratis minus quam in speciebus erectis. Areolis spinosis sed non pilosis, spinis numerosis acicularibus usque ad subulatis.

Floribus conspicuis, usque 7 cm longis, nocturnis, ex cephalo vero unilateraliter \pm immerso, lanuginoso et saetis longis oblecto, orientibus, infundibuliformis vel anguste campanulato - infundibuliformis, radiato-apertis. Pericarpello distincte ab receptaculo separato, parvo, turbiniformi, nudo. Receptaculi parte inferiore \pm cylindrica vel paulum inflata, parte superiore infundibuliformiter dilatata, toto receptaculo \pm petaloideo et basibus decurrentibus squamarum in parte dilatata receptaculi insertorum striato. Squamis in parte cylindrico absentibus vel paucis minutissimis, in parte dilatata magnis \pm ovatis, intimis in petala interiora transeuntibus, axillis omnium squamarum nudis. Foliis internis perianthii conspicuis in anthesi radiatim expansis.

Receptaculum parte cylindrica intus supra camerum nectariferam magnam \pm angustata, ibique basibus decurrentibus staminarum infimarum (primarium) distincte striata. Staminibus primarii numerosis pistillum versus \pm curvatis, longis; staminibus secundariis brevioribus partem dilatatum receptaculi usque ad faucem insertis, numerosis. Pistillo stricto, stigmatis partibus linearibus plerumque conniventibus. Ovarii cavo parvo, funiculis ovulum brevibus \pm ramosis.

Fructu oviformi, nudo, pubescente, carnoso et succoso, operculato sed ibi non dehiscente, floris residuo interdum deciduo; pericarpio carnoso, tenui, pulpa succosa, albo-hyalina. Fructibus maturis ex cephalio protrusis deinde deliquescentibus.

Seminibus campanulato-globosis vel elongatis, vel basi tubuloso-elongatis itaque pyriformibus, hilo basali porum micropylarium includenti; testa negra verrucosa; perisperio absente, embryone curvato cotyledonibus magnis.

Columnar cacti, partially upright, up to 5 m high and 15 cm thick, unbranched, or half-procumbent, ascending, offsetting from the base and thereafter forming clumps, up to 2 m tall, with 12 - 34 ribs (the procumbent species with the lesser number). Areoles large with needle-like to awl-like spines but without hairs.

Flowers from one sided true cephalium (sensu Werdermann); this in consequence of the reduction of the ribs concerned (which is the case with most true cephalia) \pm depressed ("sunken cephalium") and bears longer woolly hairs as well as stout, long, curved bristles, which cover the woolly hairs.

Flowers often solitary (even on the same plant) in size very variable, conspicuous, up to about 7 cm long, slender funnel-shaped up to very slender funnel - to bell - shaped. Pericarpel distinctly reduced, small, top-shaped, naked. Receptacle in the lower part cylindrical to slightly swollen, further above enlarging funnel-shaped, thin walled, on the whole \pm petaloid and having grooves from the narrowing base of the pericarpel up to the scales situated on the enlarging part. On the cylindrical part are only very few, very rudimentary scales, then at the enlarging part becoming rapidly quite large, becoming petaloid and changing into the inner flower petals. All scales have naked axils.

The flower petals are conspicuous, at the night-time anthesis opening wide radially. Nectar chamber in the often somewhat swollen part of the receptacle, very large, surfaced with numerous narrow gland-strips, still further above merging into a typical "channelled zone". The channelled zone topped with only a shallow, but broad to inward projecting circumferential ridge, on whose upper edge the numerous, somewhat inwards curving, primary stamens originate. Individual secondary stamens originate normally close above that, those further above \pm stood higher than the primary stamens, but with their bases running down to those below. These rows of stamens reach

to the margin of the receptacle, whilst the filaments towards the top become somewhat shorter; however, stemless anthers never appear.

The junction of the ovary with the nectar chamber will obviously be formed out of the lining tissue.

Style stick-shaped with the stigma lobes disposed close together linearly like a stick-head.

Funiculi from a basal, trunk-like piece \pm tree-like, however only few branches or compact clumps with few branches.

Fruit egg-shaped, smooth, bare and naked; the base of the dried-up receptacle forms a \pm remarkable cover, yet the fruit does not open at the lid, but deliquesces, after which it becomes pressed out of the cephalium. The relatively thin pericarp is fleshy, the pulp juicy, opaque-whitish.

Seed globular to elongated, bell-shaped with broad cut-off, basal hilum (fluminensis group) or pearshaped through extreme prolongation of the hilum region (goebelianus group). Testa black, often very bluntly tubercled; the hilum relatively small, with covered micropyle. Perisperm absent; embryo in *Coleocephalocereus goebelianus* strongly incurled with large dicotyledons; in *C. fluminensis* it is egg-shaped, not curved, with short, blunt-triangular dicotyledons.

Habitat: Brazil - upon rocks of the Atlantic coast of Sao Paulo and Rio de Janeiro, then inland on rocks of the western parts of the states of Espirito Santo, in the east and north of the states of Minas Gerais and in the south of the states of Bahia, east of the Rio Sao Francisco."

This now provides us with a fairly detailed diagnosis for this genus. The following species names may currently be encountered:-

<i>Coleocephalocereus aureus</i>	FR 1341
<i>brevicylindricus</i>	
<i>decumbens</i>	FR 1340
<i>fluminensis</i>	
<i>fluminensis</i> v. <i>mantanaensis</i> n.n.	HU 335
<i>goebelianus</i> (syn. <i>pachystele</i>)	
<i>paulensis</i>	FR 1352
<i>pluricostatus</i> n.n.	

H.M.

Comments on *Coleocephalocereus*

..... from A.W. Craig

"My imported specimen of *Coleocephalocereus brevicylindricus* was obtained from Uebelmann in the summer of 1968; on receipt the plant was found to be exhibiting a very small amount of cephalium near the crown. The plant would be about 8 or 9 cms in diameter at the time. It was not difficult to establish and by the following autumn, with some growth in the crown, the cephalium had increased from next to nothing to almost an inch across. The cephalium was composed of fine white wool together with projecting golden brown bristles. In September 1969 four or five flowers were produced, spread over the month; the flower tube was sunk into the cephalium, only the upper part of the flower being visible. The flowers grew to their full size - perhaps about $\frac{1}{2}$ " high - and remained shut for four or five days, finally opening for one day only, during the day. The flower was more or less tubular, some petals being reflexed, greenish yellow in colour."

(Further descriptive notes on this species will be found in Chileans No. 12 pp. 90 - 91. H.M.).

..... from B. Chudleigh, N.Z.

"My plant of *Coleocephalocereus brevicylindricus* is about 6 inches high and 5 inches in diameter at the base; this plant was received from Uebelmann and described as a variety of *brevicylindricus*. The flowers are almost one inch long on this plant, tubular with some reflexed petals, yellowish green in colour. I have a smaller plant, said by Uebelmann to be the species and the flowers on this plant are not as long as the flowers on my larger plant which is the variety. All my *Coleocephalocereus* flowers open just before dark, remaining open until about 10 on the following morning. This poses quite a problem if one wishes to take a slide of the open flower. The seed pods are top shaped, about one inch long and nearly half an inch in diameter at the top, tapering down to a point; the seed pod is pushed right out of the plant on the day that it appears."

..... from H. Middleditch

"It is of interest to read in Buxbaum's notes which accompany his diagnosis of the genus *Coleocephalocereus*, his reference to the bristles in the cephalium "largely covering the wool". On the other hand his diagnosis itself quite specifically states that "the long thick bristles ... cover the woolly hair". The article on "The cephalium bearing cacti of Brazil" by F. Ritter in *K.u.a.S.* 19.8.1968 included illustrations of a number of *Coleocephalocereus* species, where the bristles do not appear to obscure sight of the cephalium wool. Also on our 1969 Cactus Tour we visited the Linz Botanic Gardens where we saw a *Coleocephalocereus pachystele* (syn. *C. goebelianus*) where the wool of the cephalium was quite clearly visible between the projecting bristles. Furthermore, most of the imported specimens of *C. aureus* and *C. brevicylindricus* seen in cultivation have cephalium wool which is clearly visible through and between the longer bristles.

"On the basis of this evidence, the description of the bristles as "covering the wool" would not appear to be correct. Certainly the bristles project out much further from the body than does the wool, but without obscuring sight of the wool of the cephalium.

"In his text, Buxbaum criticizes Backeberg's original diagnosis for the genus on account of the reference to the cephalium as "sunken", which Buxbaum states is a feature of all genera with a vertical side cephalium. It is of interest to see that Buxbaum follows this comment by immediately including the same characteristic as part of his own diagnosis for the genus. It would be difficult to imagine how such a distinctive feature could be excluded from a comprehensive diagnosis.

"It is to be noted that the Latin diagnosis refers to the embryo as 'curved' whereas the German version refers to one group of species within the genus having seed with the embryo 'strongly incurled' and another group having seed with the embryo 'not curved'. If one bears in mind that the Latin diagnosis must be taken as the basic reference, it would appear that this particular statement is not correct, since it does not apply to all the plants in the genus.

"In the original Krainz-Buxbaum publication there was an illustration showing two flowers drawn the same size, but without a scale, while in the text these were described as being of two quite different sizes. In reproducing the illustration herewith, specific scale sizes have been added against each flower.

"Again in the same article, a further illustration depicted the flower of *C. goebelianus* in exterior and interior views. The exterior view shows the stigma exerted beyond the tips of the petals while the section shows the stigma clearly within the tips of the petals. This could be accounted for by the sketches having been made from two separate flowers which differed in regard to this particular feature. Or it might be due to having taken two flowers which differed in their age; since the flower life is measured in only a few hours, a freshly opened flower may

have a shorter stigma than one which is ready to close. On the other hand, the flower section may be drawn from a specimen which has been pressed before being drawn; during the process of drying the petals and tube may have shrunk a little, in just the same way that a stigma may appear to become further exerted on a flower that is just about to wither.

"There is no note in the text to explain the difference in stigma exertion between the two sketches, which is perhaps unfortunate.

"Buxbaum does refer in his text to flowers varying in size, although it is not clear whether he means varying in size on the same plant or on different plants; if we are to take the observations on the flowers of low-growing species reported above (now in the genus *Buiningia*), it would suggest that flowers vary in size on different plants. Could it be possible, however, that the better climate in New Zealand encourages the plants to produce a larger flower?"

..... from A.W. Mace

"I am not altogether surprised that Buxbaum has established the new genus *Buiningia* and transferred *C. brevicylindrica* and *C. aureus* to it. The flowers of these two species are at least as different as those of *Micranthocereus*, *Arrojadoa*, or *Stephanocereus* from the other *Coleocephalocereus* and short of going back to one genus of South American cephalium bearing cerei, I think that they must be separated.

"*Buiningia brevicylindrica* and *aurea* are not night flowering, the flowers opening at about 8.00 a.m. and remaining open until after midday and are yellow or green. The scarlet fruit and seeds are very close to *Melocactus* and apart from the non-terminal cephalium, there is very little difference between *Melocactus* and *Buiningia*. While the flowers of *Coleocephalocereus* open wide, those of *Buiningia* only open slightly like the flowers of *Arrojadoa* or the Peruvian *Melocacti*. The plants of *B. brevicylindrica* which I have seen in cultivation vary quite a bit in flower size and also in colour from yellow to quite a deep green. My HU 271 - *brevicylindrica* v. *elongata* - has quite green flowers.

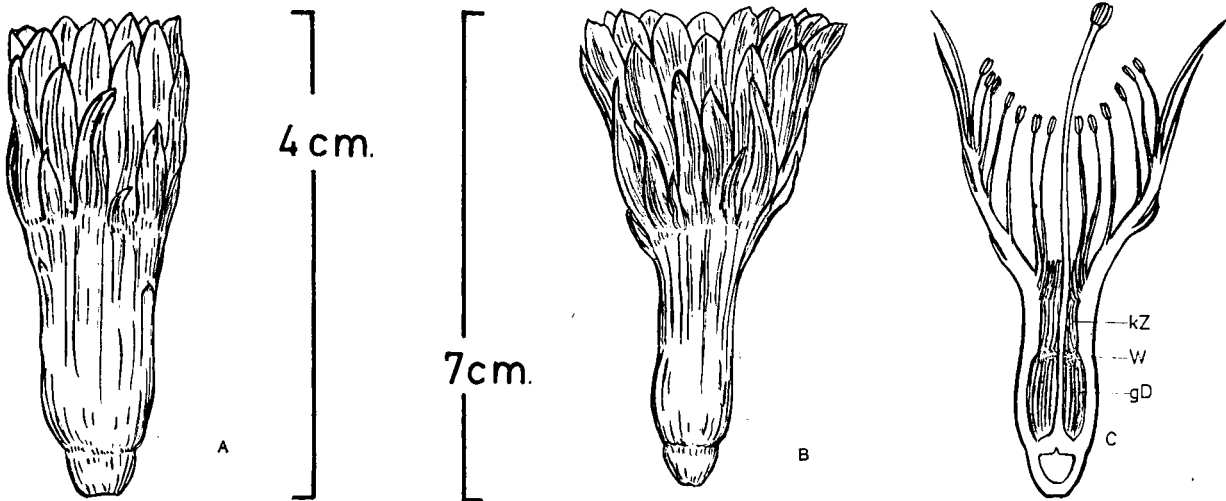
"I have all the other species of *Coleocephalocereus* apart from HU 335 and *paulensis*; *C. multicostatus* and *C. paulensis* are very close to *C. flumensis* from what I can see."

We have a slide of *Coleocephalocereus* (*Buiningia*) *aureus* and of *Coleocephalocereus* (*Buiningia*) *brevicylindrica* with a long-tubed flower - A.W.C.



Coleocephalocereus brevicylindricus K.u.a.S. 21. 11:1970

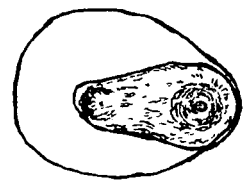
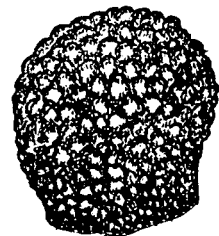
Photo. W. Andreae.



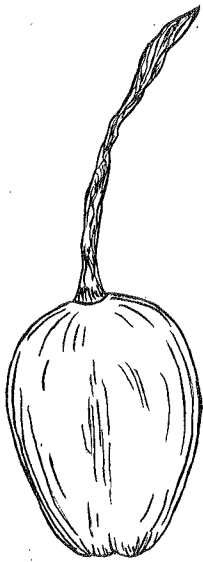
Coleocephalocereus fluminensis (Miqu.) Backbg.

A - Dwarf flower B - Normal flower C - Section of B

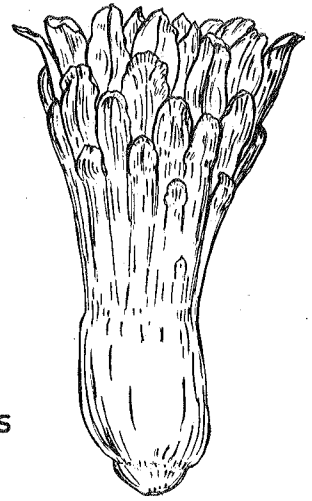
Kz - Striated zone W - tubercles gD - smooth gland tissue



BUXBAUM - KRAINZ, DIE KAKTEEN, 1. X.1970

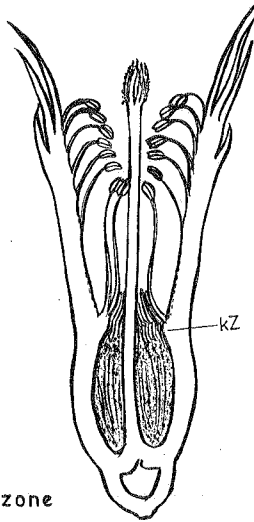
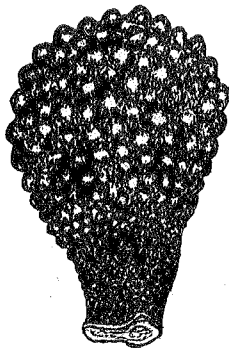


Coleocephalocereus
decumbens HB 170
Ripe fruit

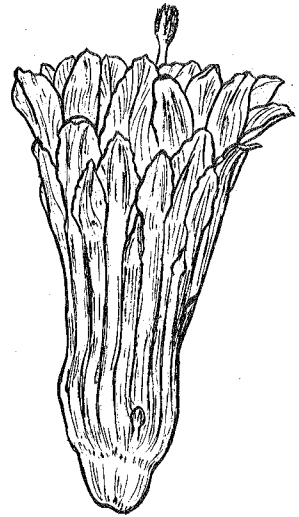


Coleocephalocereus
sp. HB 173

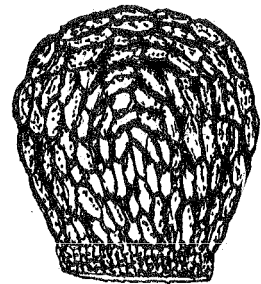
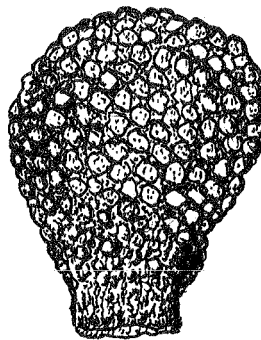
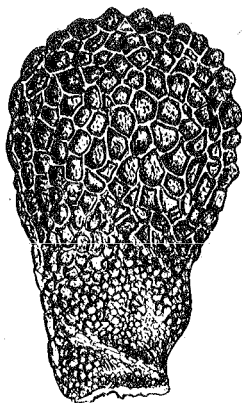
Buxbaum - Krainz
Die Kakteen 1.X:70



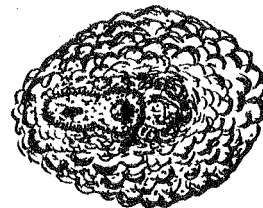
kz - striated zone



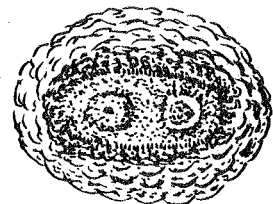
Coleocephalocereus *goebelianus* HB 150



Coleocephalocereus
goebelianus
HB 150
(K.u.a.S 21.11:70)



Coleocephalocereus
goebelianus
HW 150



Melocactus
trujilloensis

COLEOCEPHALOCEREUS GOEBELIANUS (Vaupel) Buining comb. nov. by A.F.H. Buining

(Translated by R. Moreton from K.u.a.S. 21.11.1970)

Synonyms: *Cereus goebelianus* Vaupel in Z.f.Sk. 1. 58: 1923/24. *Cephalocereus purpureus* Gürke sensu Britton & Rose in The Cactaceae I. 1920 p. 28. *Cephalocereus purpureus* Gürke sensu Werdermann in Brasilien und seine Saulenkakteen, 1933 p. 117. *Austrocephalocereus purpureus* (Gürke) Backbg. sensu Backbg. in B.f.K. 1938-6 and in Die Cactaceae 1960 p. 2497. *Coleocephalocereus pachystele* Ritter in K.u.a.S. 19, 157-8, 1968.

During my journey through Brazil in 1966/67 with Leopold Horst, we found south of Porteirinha in the State of Minas Gerais on bare rocks, near to a *Melocactus* and *Arrojadoa rhodantha* (Gürke) Br. & R., among bromeliads, a large upright growing columnar cactus with a beautiful cephalium. We had had the luck to find a new species and recorded it as No. 150.

Further north from Porteirinha we found, near Pindai in Bahia, the same plant again. At first also on bare rocks but a little further on also in sandy soil. Because it was summer it had as usual rained heavily during the night and the plants were standing in a small pool of water, in full bloom. Near Guanambi and west of Caitite we found it again. For the last time on this trip it turned up again about 35 Km west of Vitoria de Conquista.

For the rest of the trip this plant went round and round in my head and gradually it came to me that it must definitely be *Cephalocereus purpureus* Gürke. Back home again in Holland I was able to examine the literature and my supposition seemed to be confirmed: Britton and Rose as well as Werdermann had described this plant and illustrated it as *Cephalocereus purpureus*.

Britton and Rose gave as the type locality the Sierra do Sincora and "Southern central Bahia". Werdermann named the most southerly part of Bahia, on the Minas Gerais border (Caitite Tremedal). Werdermann added "the *Cereus goebelianus* described by Vaupel, after comparison with the original material, undoubtedly belongs here."

Dr Rose obtained his pictures and several flowers and seeds from Dr L. Zehntner who had two plants in his garden at Joazeiro, Brazil. Horst and I tried on our second trip to visit Dr Zehntner but he had died and nothing remained of his garden. The pictures published by Rose however left no doubt that the plant discovered by us and Rose's plant *Cephalocereus purpureus* were identical.

From the literature it was evident that none of the authors named, not even Werdermann, since Ule's trip, had been to the type locality of *Cephalocereus purpureus* Gürke. Ritter was the first to visit the Sierra do Sincora as he has already written fully (in K.u.a.S. 19, 5, 87-88). But no-one had been again to the location mentioned by Werdermann for *Cereus goebelianus* Vaupel, the Sierra das Almas, where Dr Lutzberg found this plant and *Cereus lutzbergii* Vaupel (both in Z.f. Sk. 1. 57-58, 1923/24). It is striking that in the literature *Cephalocereus purpureus* Gürke gradually grows to a column from "3 metres high or more" in Britton and Rose to "4-5 metres" with Werdermann.

As is known, Ernst Ule in 1906/7 showed to Prof. Gürke a number of dried plants which he had collected, and which were described by Gürke, as was also *Cephalocereus purpureus* Gürke. Concerning these plants which he had collected, Ule wrote in a letter of his travels in M.f.K. 18 (2): 23 1908 "but on the rocks (of the Serra do Sincora) grows only a solitary cactus, namely the little *Cephalocereus purpureus* Gürke with purple flowers. It has an upright growth and becomes only a little over one metre high."

How one arrives at 3 and 4-5 metres is easy to explain. The plants of Zehntner/Rose and Werdermann were not this *Cephalocereus purpureus*. The mistake of Zehntner was copied by Werdermann because the description fitted the plants he had found better. Friedrich Ritter had the honour of first clearing up this error. I shall come back to this later.

When I was again in Brazil in May 1968 and with Horst planned a long collecting expedition in northeastern Brazil, I proposed to visit, among other places, the Serra do Sincora and the Serra das Almas. This is easily said and I am indebted to my dear friend Leopold Horst that he was always ready and willing to undertake long journeys in very difficult country, to get to a particular place although it was not financially very easy for him.

We come at last to Cereus goebelianus. On July 10th 1968, we drove from Brumado to the township of Livramento do Brumado, at the foot of the Serra das Almas, at 450 m. Further over on the mountain we saw a beautiful waterfall, which provided the electricity for Livramento. Here we looked for and found Cereus goebelianus Vaupel in fair numbers, but only up to about 900 m altitude. It was undoubtedly this same plant which we had collected in the previously mentioned places and that which Britton and Rose and Werdermann called Cephalocereus purpureus. At this location on the Serra das Almas, no other cactus occurred. Only above 900 m one met a Melocactus and Cereus lutzburgii Vaupel and here and there Leocereus bahiensis Br. & R.

It was also clear that Britton and Rose, as well as Werdermann, had made a mistake. Backeberg in 'Die Cactaceae' and in 'Kakteenlexikon' only repeated what others had written and based his own story on it, since he had never been in that part of Brazil. It shows also that this Cereus goebelianus Vaupel is identical with Cephalocereus purpureus Gürke sensu Br. & R. and sensu Werdermann. Ritter had chosen a new name for this species namely Coleocephalocereus pachystele (K.u.a.S. 19 (8): 157-158, 1968). He was on the Serra do Sincora and saw there that Werdermann had made a mistake, but this name must give way to Cereus goebelianus.

Ritter's description of his Coleocephalocereus pachystele is unfortunately invalid, nevertheless this good and detailed description can serve as an amendment to Vaupel's Cereus goebelianus. (Ritter was at that time of a different opinion. He wrote "The statements that Vaupel made regarding stem thickness, number, length and thickness of spines and the pericarp vary so considerably from the corresponding characteristics of that species which Werdermann wishes to identify with Vaupel's species that a publication of the false Werdermann's Cephalocereus purpureus is necessary" - Editor K.u.a.S.).

Ritter was certainly between Brumado and Ourives (as we were also) 70 Km southeast of Serra das Almas, where Cereus goebelianus occurs very frequently. Without doubt this species belongs to Backeberg's genus Coleocephalocereus, as Backeberg had already supposed in his 'Kakteenlexikon' - without having a plant from the locality to be sure, but on the basis of a seed offer from the firm Winter in March 1965. The statement there 'Coleocephalocereus FR 1234 goebelianus (Vpl) Ritt' holds good for the 1968 Ritter description of Coleocephalocereus pachystele and Ritter told me personally that he had never been to the type locality.

Therefore Backeberg's transposition was unfounded and cannot be recognised. Moreover Ritter wrote in K.u.a.S. p. 157 1968 "a recombination (of Cereus goebelianus Vaupel) cannot be undertaken until material from the type locality has been carefully examined". That is typical of Ritter, a very exact and conscientious person. On the grounds of the foregoing considerations I place the recombination in my name.

Since as far as I know, the holotype material is lost, I deposited a neotype of Cereus goebelianus in the Herbarium of the University of Utrecht, Holland.

COLEOCEPHALOCEREUS PACHYSTELE Ritter spec. nov. by F. Ritter

(Translated from K.u.a.S. 19.8.68 by R. Moreton)

Synonyms: Cephalocereus purpureus sensu Werdermann, non Gürke (Brasil u.s. Saulenk. 1933 p. 117). Austrocephalocereus purpureus sensu Backeberg non Gürke in Die Cactaceae 1960 Vol. IV p. 2497.

Cereus goebelianus Vpl. (Z.f.S. 1923 p. 58) must, as a result of the statement that the cephalium bears numerous long, bent and twisted bristles, belong to *Coleocephalocereus*, since the bristles of all *Micranthocereus* are sparse and almost straight: A recombination cannot be undertaken until material from the original locality is carefully examined. Werdermann held that *C. goebelianus* was identical with his new species which he mistakenly identified with *Cephalocereus purpureus* (*Coleocephalocereus pachystele* Ritter sp. nov.). The statements made by Vaupel regarding stem thickness, number, length and thickness of spines, and about the pericarp, vary so considerably - also taking into consideration the degree of variation present at many different locations - from the corresponding characteristics of this other species which Werdermann wanted to identify with Vaupel's species, that a publication of this false Werdermann's *Cephalocereus purpureus* is necessary. I describe this species herewith as *Coleocephalocereus pachystele* Ritter sp. nov.

Columnae, $1\frac{1}{2}$ ad 6 m altae, interdum paulum ex basi proliferantes, 7-12 cm crassae, virides; costae 14-27, crenatae; areolae $2\frac{1}{2}$ -5 mm diam., 4-10 mm inter se distantes, albae; spinae rectae vel curvatae, gilvae, basi fusca; 12-18 marginales, crassiaciculares, 10-15 mm longae; 4-8 centrales, subulatae, 10-60 mm, spinae cacuminis excelsi omnes aciculares; stirps primordialis globosus, cum spinis centralibus hamatis; cephalium laterale, latum, non immersum, lana alba subtilissima et densa ac saetis nigrescentibus curvatis instructum; flores nocturni, 40-50 mm longi, prope vertice; ovarium albidum, fere globosum, nudum, superne constrictum; camera nectarifera ampla, nuda, filamentis infimis clausa; receptaculum supra eam tubiforme, paucis squamulis instructum; filamenta alba; infima 18-20 mm longa; supra ea lacuna; filamenta sursum decrescentia, antheris prope receptacula; stylus albus; stigmata albida, prominentia; petala linearia, late patentia; interiora alba, exteriora paulum viridia et fusca; fructus 12-20 mm longus, turbinatus, purpureus, operculo 6-8 mm diam., sine catino; pericarpio tenui, non aperiente; semina atra, opaca, $1\frac{1}{2}$ mm longa, inferne tenuia, tuberculata, hilo parvo, non oblique.

Habitat Bahia australis.

Growth. Columnar from $1\frac{1}{2}$ to 6 m high, sometimes offsetting at the base with one or two parallel stems, 70-120 mm thick, green.

Ribs on mature examples 14-27 of 8-13 mm height, blunt, somewhat thickened at the areoles; notches above the areoles cut $\frac{1}{4}$ to $\frac{1}{3}$ of the depth of the rib; somewhat winged furrows going upwards from the areoles; grooves between ribs somewhat winding, acute.

Areoles round or oval $2\frac{1}{2}$ -5 mm across, running from the humps into the notches; 4-10 mm clear space between; with sparse white felt.

Spines straight to curved, flexible yellowish, with red-brown base, the centrals tipped brown. Radials thick acicular 12-18 of 10-15 mm length, right round the areole, porrect or semi-porrect. Centrals 4-8, 10-60 mm subulate, the lowermost longest. On high heads, all spines acicular and radiating. Seedlings spherical at 50 mm high, 45 mm across with 9-10 ribs; at 70 mm high about 55 mm across, at 120 mm high about 70 mm across; seedlings, when a few centimeters high have several hooked centrals of 10-30 mm long.

Cephalium is on the sunny side of the stem. In a sunny open position they can develop when a height of 400 mm is reached - in the shade they never develop. A specimen growing in a fairly shaded spot first began a cephalium at 6 m height; the columns hardly ever grow taller than this. The cephalia are very wide, mostly of stem width and uninterrupted, often over 1 m long; they encompass a dozen or more ribs which are deeply depressed and somewhat narrowed, with areoles of about 8 mm length and 5 mm width which are only a few mm apart from each other. The cephalia are not sunken into the stem, but the stem is flattened to a distance of about 25 mm from the stem centre. The 'not-sunken' formation of the cephalium applies to all species of *Coleocephalocereus*, including the type species, *fluminensis*, about which Backeberg asserted the opposite. The cephalium consists of very fine white wool; each areole provides a thick wool ball about 25 mm long together with a number of 40-50 mm long black to dark brown bristles curved strongly upwards,

especially on the lower end of the areole. The wool of all *Coleocephalocereus* species is finer and thicker than that of *Micranthocereus* and *Gerocephalus*.

Flowers - first open at nightfall and close at first light; they are without scent, 40-55 mm long and with the petals fully expanded 25-28 mm wide, projecting about 20 mm from the cephalium. Flowers appear singly one after the other and always at a particular distance from the top of the plant so that semi-circular zones of buds, flowers, unripe and ripe fruit follow one another, just as in *Melocacti*.

Pericarp white, almost spherical, 4-5 mm long and about 6 mm wide; 2 mm of the length is taken up in the thickness of the wall with the nectary. In the region of this wall is found externally a sharp constriction.

Nectary about 10 mm wide and 1-18 (?? R.M.) mm long, white naked, scaleless, full of nectar, the top closed by the lowermost stamens which are bent towards the pistil and thickened, forming an undeveloped diaphragm.

Tube - upper part cylindrical, 23-27 mm long, inside white, outside white or pinkish with a few pink scales, the lowest 1 mm long and wide, triangular, further up larger, without hairs, turning into the outer petals.

Filaments white, the lowest ring 18-20 mm long with the anthers bent back against the wall; for about 7 mm above this is a gap then the upper series of stamens which are shortened to 3-5 mm; the pale yellow 1 mm long anthers form a thick coating on the wall.

Pistil white 37-50 mm long of which 3-4 mm are taken up by the projecting stigma lobes which are about ten in number, white and bent in towards each other.

Inner petals white 10-12 mm long, 4-5 mm wide, almost linear, rounded above, rotate, with ends reflexed; outer petals rather similar, but rather greenish and red-brown.

Fruit about 14-20 mm long, almost as much across, the widest part towards the top, much tapered towards the base with blunter base, purple-red, white at the base; scaleless with fine longitudinal ribs, especially around the flower remains which sits flat on the fruit. Wall of the fruit towards the base only $\frac{1}{2}$ mm thick, further up 1 mm thick, not refractive, beneath flower remains 3-4 mm thick. Flesh slightly juicy, white, insipid. Fruit does not dehisce, either falling off or, mostly, drying up remaining in the cephalium.

Seed $1\frac{1}{2}$ mm long $1\frac{1}{4}$ mm wide matt black, very much tapered towards the hilum, otherwise rounded with roundish tubercles, somewhat thicker towards the rounded end; hilum small, oval, not slanting.

Type locality - Urandi, Bahia state.

Distribution - southern Bahia, hardly going over the border to Minas Gerais. Many places, but not frequent, only in the low lying areas.

This species has my number FR 1234. I found it again in January 1964. I photographed a flowering head at Ourives, Bahia. Two photographs of this species are to be found - Werdermann's 'Brasilien und seine Saulenkakteen' p. 58 and 117 under the erroneous title *Cephalocereus purpureus*. Herbarium typus from Urandi, Bahia in the University of Utrecht.

Comments on *Coleocephalocereus goebelianus*

..... from H. Middleditch

"My first reaction to these two comprehensive articles dealing with this species, is to feel rather confused by the string of names which appear in the historical survey. However, it would appear that we have two species concerned, *Coleocephalocereus goebelianus* originally described by Vaupel - and *Cephalocereus purpureus* described by Gürke. Both Britton and Rose, and Werdermann,

evidently wrote about *C. goebelianus* Vaupel but mistakenly identified it as *C. purpureus*. It would seem that when Ritter rediscovered *C. goebelianus* he appreciated that this plant was the one erroneously described as *C. purpureus* by Werdermann and also by Britton and Rose, so he called it *C. pachystele*. However, as Buining observes, this description is not valid since the original diagnosis of this species as *C. goebelianus* has priority and must stand.

"My own small seedling of this species on its own roots is barely 15 mm across, but the central spines have a quite distinct hook at their tips. A second specimen is grafted, ex de Herdt, now about 35 mm diameter and this plant also carries the distinct hooked central spines."

..... from A.W. Mace

"My own seedling of *C. goebelianus* from de Herdt also has the hooked central spines. This seems to be a peculiarity of *Coleocephalocerei* since both *C. aureus* and *C. brevicylindricus* seedlings have hooked spines, not present on mature plants.

"My imported *C. goebelianus* fits in every way with the information given in Buining's article from *Die Kakteen*. The black bristles on my plant pretty well cover all the white wool but I would put this down to the cephalium not being in growth which may explain the discrepancy. Certainly the other species with growing cephalia show plenty of wool.

"On re-examining my photographs of the flowers of this plant I find that the stigma is not exerted at about 9 p.m. but on one photograph taken the following morning (of a different flower, admittedly) the stigma is exerted above the level of the petals. This is not very surprising since the development of the flowers is very rapid, the buds only appearing about midday on the day they are going to open."

ESTABLISHING AN IMPORTED *COLEOCEPHALOCEREUS GOEBELIANUS* by A.W. Mace

During August of 1970 I was fortunately able to visit the Su-ka-flor nursery at a time when a number of cephalium-bearing plants were on stock. I purchased a number of different species - mostly I went for specimens just beginning to form a cephalium; this should put less strain on the plant. Also by the same token plants with the more superficial type of cephalium such as *Micranthocereus*, *Arrojadoa*, *Stephanocereus*, *Thrixanthocereus*, should be easier than others like *Austrocephalocereus dybowskii*, *Cephalocereus goebelianus*, and *Espostoa*, with a deep cephalium groove.

I am fortunate in that most of the plants which I bought already had some roots and I managed to get them established before the winter set in - except for the *C. goebelianus* which was about 500 mm high and about 100 mm in diameter with about 100 mm of black bristled cephalium. Amongst those I acquired it was the biggest plant, with the largest cephalium, completely unrooted and it had started shrinking a bit. Not realising that any special problems were involved, this was potted up in my usual Levington compost, kept moist, and occasionally sprayed. I knew these plants required extra winter warmth and I constructed a 'tent' of clear corrugated plastic inside the greenhouse heated with an electric cable. The plants were installed about the end of September and kept at a minimum of 15°C with occasional watering. The plants with roots such as *Austrocephalocereus dybowskii* and *Stephanocereus leucostele* plumped up nicely and looked quite happy. The *Coleocephalocereus goebelianus*, while remaining intact, slowly decreased in diameter. In December it was examined and found to be still quite rootless.

After discussions with various people I realised that there was a general problem of rooting this type of plant. The production of adventitious roots from a cutting is under the control of hormones called auxins. When a cutting is taken from a plant the cells at the surface of the cut

undergo some interesting changes and produce callus tissue. This consists of a mass of undifferentiated cells which, under the right conditions, will later divide and form root cells. It is highly probable that the production of a cephalium when a plant reaches maturity is also under hormonal control. It is possible that these 'maturity' hormones in some way interact with the normal build up of auxin which initiates rooting in a cutting.

I kept my *Coleocephalocereus goebelianus* at 15°C in the tent all winter occasionally spraying it hoping that it would root in the favourable conditions in the spring.

In April I experimented with various rooting media, temperatures and humidity. I also tried the effect of hormone rooting powder, all without the slightest effect. In May the cephalium started producing flowers in ones and twos. I decided that the callus tissue had become hard and peeled it off. Underneath the plant tissue was firm and healthy. I applied more hormone rooting powder and tried again. Still no results.

Further literature search revealed the fact that rooting hormone encourages roots up to a certain concentration but above this actually inhibits them - a point well worth noting.

I then cut a 5 mm layer off the bottom of the plant and allowed it to callus for two days over a bowl of water, producing a soft spongy tissue. It was then treated with a minimum of hormone rooting powder and placed on the surface of a bowl of sand with water in the bottom. In about two weeks roots started to appear, possibly in spite of my efforts, although I like to think because of them.

The roots have continued to grow and the plant is beginning to fill out. It remains to get it growing without showing too much of a violent check. I was several times very tempted to graft the plant but was held back because of its diameter, which is over 10 cm even when shrivelled. I would imagine the distortions produced by drying cut surfaces this size would make keeping them in close contact difficult. Possibly somebody very much more skilled at grafting than myself could have managed it.

How does a plant know when it is large enough to start flowering? It is certainly not controlled by the amount of nutrient available, since many of these cerei have quite small flowers. Perhaps some chemical has to reach a critical concentration, or alternatively some inhibitory chemical could be produced in the roots which prevents a cephalium forming until it can be sufficiently diluted by passage up a tall stem. In any case the reason why *Coleocephalocereus brevicylindricus* forms a cephalium at 10 cm while *Coleocephalocereus goebelianus* needs to be 2 m or more in height is a fascinating puzzle.

I am certainly interested in exchange of information on these plants with anyone else growing them.

..... and some further comments from P. Sherville

"In October 1970 I purchased a plant of *Coleocephalocereus brevicylindricus* from Jumanery cacti. It was very much shrivelled and rootless when bought; although there was a clean callous underneath it was very deeply concave, to the point that the whole plant looked to be not much more than a thick "skin". It was conical in shape and had just started a cephalium, but the whole plant looked healthy and was a nice deep green colour with long golden brown spines, otherwise I probably would not have bought it.

"Anyway, having got it home, it was nearing the end of the season for rooting, but I gave it a drink and placed it in some damp peat and sand mixture. I usually maintain about 60°F in the greenhouse during the winter and the plant was in a tray on the staging along with a number of other plants. All were more or less left to themselves for the next few weeks, only an occasional squirt from the hose as and when I remembered.

"Come spring of 1971, various other collectors had come and gone and passed remarks such as "you'll be lucky to hang on to that one" and similar, as I have no doubt you will have experienced yourself. During this time the plant had remained relatively unchanged but after a few good heavy waterings a sudden and dramatic change occurred - it swelled and it swelled and it swelled..! So I thought, well, at least it must have developed some roots to take in that amount of moisture (as you are no doubt aware many plants can take in moisture and plump up without having any roots) but this one had roots alright. I could not even move it!

"About the middle of May some of the other plants in the same tray required to be moved so I decided that the *Coleocephalocereus* may as well be potted up too. When I had removed the other plants from the sand and peat in the tray, I tried to uproot the *Coleocephalocereus* but with no success, it was firmly anchored. I took the tray outside and emptied all the loose aggregate off and tried again. Third time lucky - it came adrift but it brought all the rest of the aggregate with it and there was one solid sheet of root right across the bottom of a standard plastic seed tray (9" x 14"). It had to be put in a 7" pot just to accommodate the root system and even then substantial amounts of root were removed, mostly accidentally. While potting it up I noticed that the base which seven months earlier had been so deeply concave was now almost as much convex, thus giving the plant an almost spherical base - it still retained its conical top.

"The compost I use is rich - too rich according to some of my fellow-collectors! It consists of about 15% leafmould, another 15% of dehydrated cow manure, about 20% of peat, about 30% soil out of the garden and about 10%-15% of sand - some 15% for this particular plant. The few remaining % consists of fertilisers and lime.

"Evidently this plant liked the mixture as within days conspicuous additions to the cephalium appeared together with new spines and new growth generally. About a week later five pale green areas appeared in the fresh cephalium. These rapidly developed into flowers of almost the same colour, a pale greeny-yellow. Since then I have had a succession of blooms generally four to six at a time every month to six weeks. The plant is now about 14 cms ($5\frac{1}{2}$ ") in diameter at the base and about 9-10 cms ($3\frac{1}{4}$ ") high.

"I have just been out and measured the flowers; they are about 12/15 mm ($5/8$ ") high and about 18-20 mm ($\frac{3}{4}$ ") wide when fully expanded. None of them have set fruit despite my attempts with a paint brush. From their first appearance in the cephalium the buds take about seven to ten days to mature, most of the growth being in the last twenty four hours. Mine have all opened very late at night - about midnight to one o'clock - and are very consistent in timing. They last, depending very much on the weather, until about midday on a cool cloudy day, but others have faded before 8 a.m. on sunny days such as today. The thing which strikes me as being unusual is that the flower closes up perfectly on fading and stays apparently fresh looking for all the world like a new bud for maybe a week or even ten days after opening. Then it gradually diminishes in size and goes a pale brown as it is displaced down the cephalium.

"The other *Coleocephalocereus* or *Buiningia* which I have are just seedlings from de Herdt."

NOTOCACTUS HERTERI Werdermann 1936 by G. Geelen & G. Konigs

(Translated from *Succulenta* for March 1969 by W.W. Atkinson)

This handsome plant was found by Herter in Uruguay in 1933 in Department Rivera, Cerro Calgo, in crevices in red sandstone at an altitude of 300 meters, near to the Brazilian frontier.

Werdermann described the plant in *Revista Sudamericana de Botanica*, 4/6: 143-144 (1936) as follows:

Globular or elongated globular, up to 15 cm diameter, pale green, ribs about 22, distinctly notched; radials 8-11, white or with brownish tip; centrals 4-6, mostly crosswise, up to 2 cm long, reddish-brown; flowers purple, 4 cm long.

Notocactus rubriflorus (Kolischer) may well be a synonym; it was described in Kreuzinger Verzeichnis, 22, 1939.

Notocactus herteri Werd. is generally understood to be slow growing and late flowering. The plants in the collection Fabian-Geelen do not agree with this description, however. They were sown four years ago, and flowered for the first time this year at a diameter of 10 cm.

The fickleness of nature is again demonstrated in that, contrary to the above, a ten year old specimen in the collection of Konigs, which at a diameter of 14 cm is more or less fully grown, has not yet flowered.

In the summer the plant gets plenty of fresh air, sufficient water and full sun, in the winter much light, air, and dryness. It, and all other plants in the collection are grown in 'Meyer's Chemie Erde C'. For those who do not know this Chemie Erde - it consists basically of loam, sand and roof-tile grit, enriched by the necessary minerals. Chemie Erde C. is for amateurs who water exclusively with rainwater. Chemie Erde B is comprised of peat, sand, and loam and is for those who use tap water.

Until recently *Notocactus herteri* qualified as the only *Notocactus* with purple flowers. With the discoveries of the last few years in Brazil and the frontier regions, however, we know that there can be more, such as for example the plants that are being offered as HU 78.

Notocactus horstii Ritter, has flowers which are orange coloured lower down, changing to red above.

Comments on *Notocactus herteri*

..... from H. Middleditch

"During our 1969 Cactus Tour we called on Max Schliepfer near Augsburg. He had a batch of some two to three dozen *Notocactus herteri*, some of which had crowns entirely spineless and the wool of the new areoles was nearly covering up the epidermis in the crown altogether with a cushion of wool. Some other plants had the crown roofed over with spines, which varied in colour from orange-reddish to reddish brown or even dark brown, all being reddish at the base.

"Those plants which lacked the roofing-over effect of the spines at the crown had spines which were either dark brown or pale brown, again all reddish at the base.

"The majority of plants of this species which I have seen in collections appear to possess an epidermis which is a much paler shade of green than most other *Notocacti* - indeed I would be tempted to refer to it as slightly yellowish green. Although the hump or chin formed between areoles is only two or three mm high, it is both fairly short and narrow so that although these tubercles are somewhat dwarf in stature they are quite distinctive - rather more so to my eye than any other of the *Notocacti*."

.....from J.D. Donald

"*Notocactus herteri* - HU 20; the precocity of seedlings in flowering is quite common. The ease with which many plants grown from seed, collected by Friedrich Ritter or Leopold Horst and others, flower whilst older mature plants of long cultivation do not, has frequently been remarked upon. *Arequipa rettigii*, *Oroya peruviana*, *Notocactus herteri*, are three examples out of many. The older plants, despite being given identical treatment, grow well enough but fail to reach anthesis.



NOTOCACTUS HERTERII
Collection & Photograph - A.W.Craig

"With N. herteri the situation is even more mysterious, because there appears to be quite distinct clones of older prewar material. One flowers, the other does not. Gunther Konig's plant clearly belongs to the latter clone. My own 'original' herteri is derived from the former and flowers regularly each year and is a plant of some 100 mm in diameter. It produces rings of glorious shiny, satiny rosy purple flowers with rich orange yellow stamens and style at the centre. In full sun the tepals fold back flat upon the crown very similar to N. rutilans to which the plant is clearly related with the flower slightly more campanulate than funneliform. The epidermis is bright grass green and the body multi-ribbed as in the description. Like many of the Notocactus family, the old plants develop a discoloration on the lower stem giving it a yellowish brown appearance - this climbs slowly up the plant body, the green epidermis becoming yellow green then yellow brown. The multi-ribbed appearance reminds one somewhat of N. werdermannianus which also has a campanulate rather than a funnel form flower and the similar small tuberculate hump or chin separating the areoles.

"Horst rediscovered N. herteri near Livramento on the Brazil-Uruguay border. The spines of herteri are typically dark, orange reddish when young but becoming reddish brown to dark brown to black in age. However, much lighter spined plants also with purple flowers were discovered by Horst near Santa Maria and Candelaria, HU 20 a, b and c. These differ in several respects from the true herteri, not only in spine colour and a new name has been suggested for these - N. purpureus. Thus there are now three purple flowered Notocacti: N. herteri (rosy-purple): N. uebelmannianus HU 78 (reddish purple) and related to N. arachnites and N. crassigibbus; and N. purpureus. Some forms of N. rutilans are very deeply coloured but the basic background is always yellow, upon which is infused the reddish mauve tint, whereas in the former three species the basic background is always purple."

..... from P. Sherville

"I have a plant of *Noto. herteri* which I obtained as a grafted scion from Kaktimex in 1964. It is now just over 5" in diameter and the new spines in the crown are a reddish or foxy brown colour. It produced a few flowers shortly after receipt and the remains continue to be firmly attached to the plant. I would describe the flowers as a deep pink colour rather than purple. It is now in bud again so I am hoping for another display of flowers this season."

* * * * *

We have a slide of this last-mentioned plant in flower in the slide library - A.W.C.

NOTOCACTUS PURPUREUS RITTER SP. NOV. by F. Ritter

From Succulenta July 1970

Globosus, postea procerus et clavatus, ad 14 cm crassus, basi saepe proliferans; vertice paulum immerso, lanato; costis 14-19, rectis, 7-15 mm altis, crenatis, obtusis, tuberis 2-3 mm altis; areolis orbicularibus, inter tuberos, albis, 3-5 mm diam., 5-8 mm inter se diatantibus; spinis acicularibus; radialibus ca. 15, albis rectis, 6-14 mm longis; centralibus 4-6, fulvis, rectis vel curvatis, 8-20 mm longis; floribus ex vertice, 4 cm longis; ovario lana alba obtecto, saetis carente; sulco nectarifero 1½ mm longo, semiclauso; tubo florali infundibuliformis, 12 mm longo, superne aliquis saetis, brunneis instructo; filamentis pallide flavis, antheris obscure aureis; stylo pallide flavo, stigmatibus ca. 10, patentibus, 7-8 mm longis, albidis; petalis purpureis, 18 mm longis, 4-5 mm latis; fructu rubroviride; seminibus 1 mm longis, atris, hilo basali prominente. Habitat: Serra Geral australis, Rio Grande do Sul. FR 1268.

(There are several 'Serra Geral' to be found on the maps in Rio Grande do Sul but from the above it would seem probable that the particular mountain range referred to above is that shown on the map on the front cover of *Chileans* No. 17 - H.M.)

NOTOCACTUS PURPUREUS RITTER by A.F.H. Buining

(Translated by W.W. Atkinson from *Succulenta* 10/1970)

The Latin description of *Notocactus purpureus* Ritter, written by Ritter appeared in the July 1970 issue of *Succulenta* on p. 109.

This Latin description is fairly detailed and the interested reader can certainly extract the most important details. It is Ritter's intention to produce a book in the German language, next year, which will be so detailed, at least according to him, as to make the plants easily identifiable.

I photographed this exceptionally beautifully flowered plant from the Horst collection on 25th August 1968 as HU 20a. Together with Ritter Horst collected the plant under this number. The area in question, in about the centre of the state of Rio Grande do Sul, consists of a number of quite high hills which are in the main heavily overgrown. On one of these hills is to be found the already described *Notocactus horstii* Ritter. With Horst I climbed various of these hills and we collected a number of species closely related to this *N. purpureus*. As I said, in the middle of the state the hilly region becomes appreciably higher and wilder. On the often very steep hillsides one frequently sees bare rocky patches in the heavily wooded slopes, probably partly because the slopes go vertically upwards, often for a few hundred metres, though sometimes only for a short

distance. Trees, at least the larger ones, cannot find enough anchorage, and it is just on these mostly inaccessible spots that cacti grow, including the above species. One must therefore try to approach from the top downwards, with the help of a rope. According to Horst, some very poisonous snakes live in cracks in these rocks, and the Brazilians are not at all keen on joining these expeditions.

It is very probable that related species, or even new species, of *Notocactus* will be found here. There are many hills with very steep sides in Rio Grande do Sul and there is a big work-area for climber-collectors. Alas, there are only a few featherweights who can scale the mountains as agilely as Friedrich Ritter, who, as his companion often told us, took every risk personally - though with the necessary caution - but still in a manner not many others would adopt.

In this way he has found many new plants, and Horst has had, if but briefly, some very good instruction. Let us hope that there will soon be seed offered of this species, for such flower colours in *Notocactus* are very desirable.

A FIRST LOOK AT LOBIVIA SEEDS from J. Hopkins

One or two of my correspondents have talked about the problems of classifying and identifying *Lobivias* and ventured the thought that it might be useful having a look at some seed. The basic problem is really obtaining seed that is reliably named - anyway I ordered samples of a dozen or so different species from Sargent.

I found that a magnifying glass was quite adequate for picking out differences in the seeds. It was a fairly pleasant surprise to find that there were at least six distinctly different sorts of seeds in this first batch. The testa is slightly shiny on some and matt black on others. Most of them seemed to have a light brown appearance which was due to a black background and an overlay of light brown tracery. Some were nearly spherical, others almost broad bean shape. The shape of the hilum varied but the degree of depression of the hilum was roughly the same in them all. They were all about the same size. Several had a quite prominent ridge or keel at one side of the testa.

It does look as though there are differences in the seeds which are quite readily visible, so I will send off to Sargent for a better range of species and also try other sources of imported seed.

(Some Rausch-collected seed has now been obtained as well for examination and it is hoped to publish more information on the results of this study in 'The Chileans').

CHILEANS NATIONAL GATHERING SEPTEMBER 8th - 10th 1972

A few vacancies are still available on this weekend course, which is being held at Brooksby Agricultural College near Melton Mowbray. The residential accommodation has just been rebuilt as individual study bedrooms.

Talks will be given by Mrs. J.M. Hobart on Flower close-ups, by D.J. Lewis on Seed shapes and sizes, and by other speakers on *Gymnocalycium*, *Notocactus*, *Parodia*, and *Lobivia*, and on ways and means of identifying and naming a plant. There will also be talks and discussions in smaller groups on photography (for those with queries and problems rather than for the experts) and on painting and sketching cacti. Other informal discussion sessions will be arranged for small groups, each on a particular plant genus, with a selection of plants, slides and photographs, etc. handy.

All participants are asked to bring as many plants as they can transport of any South American species, also slides and photographs, paintings or sketches for the informal discussion sessions. Anyone desirous of having a red-carpet reception could always try tempting us by offering to bring a volume or two of the Schumann-Gürke 'Monatschrift', or of the Schumann-Gürke 'Bluhende Kakteen' or even Vol. III of Backeberg's 'Die Cactaceae'!

It is expected that most of your Officers and several Study Group leaders will take part in the course.

Full information and booking form from Mrs. J.M. Hobart, 39 Woodside, Darras Hall, Ponteland, Northumberland.

FORTHCOMING ARTICLES

We should be pleased to hear from any readers who have tried to establish imported specimens of *Arrojadoa* or grown them from seed; or obtained a flower or fruit on *Gymno. horstii*; or obtained any elongated fruits on *Parodia*; or had a seed pod set on any *Uebelmannia*; or have flowered a *Weingartia* FR 50 = *W. neumanniana*; or know of a source of red spider which preys on red spider mite or its correct name.

STUDY GROUPS/ROUND ROBINS

Cleistocacti	T. Lavender, 62 Finchale Avenue, Billingham, Teesside. TS23 2EB
Copiapoa	D.J. Lewis, 80 Pencisley Road, Llandaff, Cardiff. CF5 1 DQ
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	J. Hopkins, 25 Grossefield Road, Cheadle Hulme, Cheadle, Cheshire. SK8 5PD
Matucana/Borzicactinae	Contact the Chileans
Mediolobivia	J.R. Chapman, 5 The Crescent, Raunceby Hospital, Sleaford, Lincs.
Melocactus/Discocactus	Mrs. L. Teare, 7 Birkinshaw Avenue, Tranmere, South Australia 5073, Australia.
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, Lincs.
Photographing Cacti	A.W. Craig, Davela, Forest Lane, Kirk Levington, Nr. Yarm, Yorks.
Sulcorebutia	W.G. Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs. FY5 5EG
Trichocereus	N.T. Hann, 5 Lake Road, Shirley, Croydon, Surrey, CRO 8DS

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CONTENTS

	Page No.
Gymnocalycium pflanzii by M. Broekhoven	59
A visit to the Riviera by Mr. & Mrs. T. Lavender	63
Walter Rausch - His 4th expedition to South America, Part 3 by G. Streiter	66
Some observations on Notocactus Flowers and Fruits by Mrs. J.M. Hobart	67
What is a Cephalium? - Part 3 by Prof. F. Buxbaum	70
That Latin from our Readers	74
The North-West Chaco by H. Middleditch	77
Gymnocalycium of the Group Microsemineae Fric - Part 5 by Dr. Bohumil Schutz	79
Photographing and preserving sections of cactus flowers by Mrs. J.M. Hobart	89
Neochilenia woutersiana flowers by J.W. Welsh	91
Delaetia woutersiana backeberg by C. Backeberg	91
Treatment of imported plants from our Readers	97
The genus Coleocephalocereus Backeberg by H. Middleditch	98
Coleocephalocereus goebelianus by A.F.H. Buining	106
Establishing an imported Coleocephalocereus goebelianus by A.W. Mace	110
Notocactus Herteri by G. Geelen and G. Konigs	112
Notocactus purpureus Ritter by F. Ritter	115
A first look at Lobivia seeds by J. Hopkins	116
Chileans National Gathering 1972	116