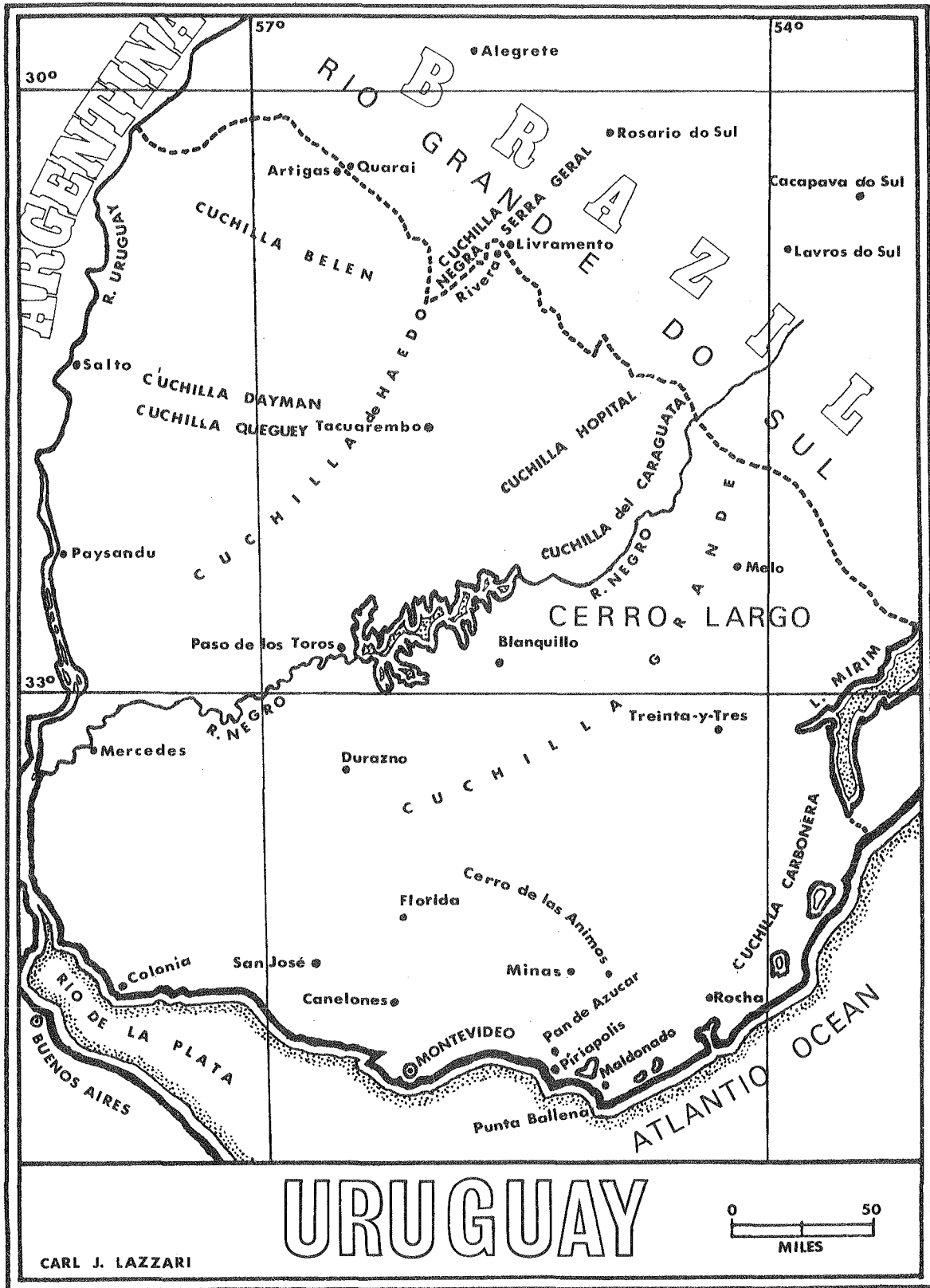
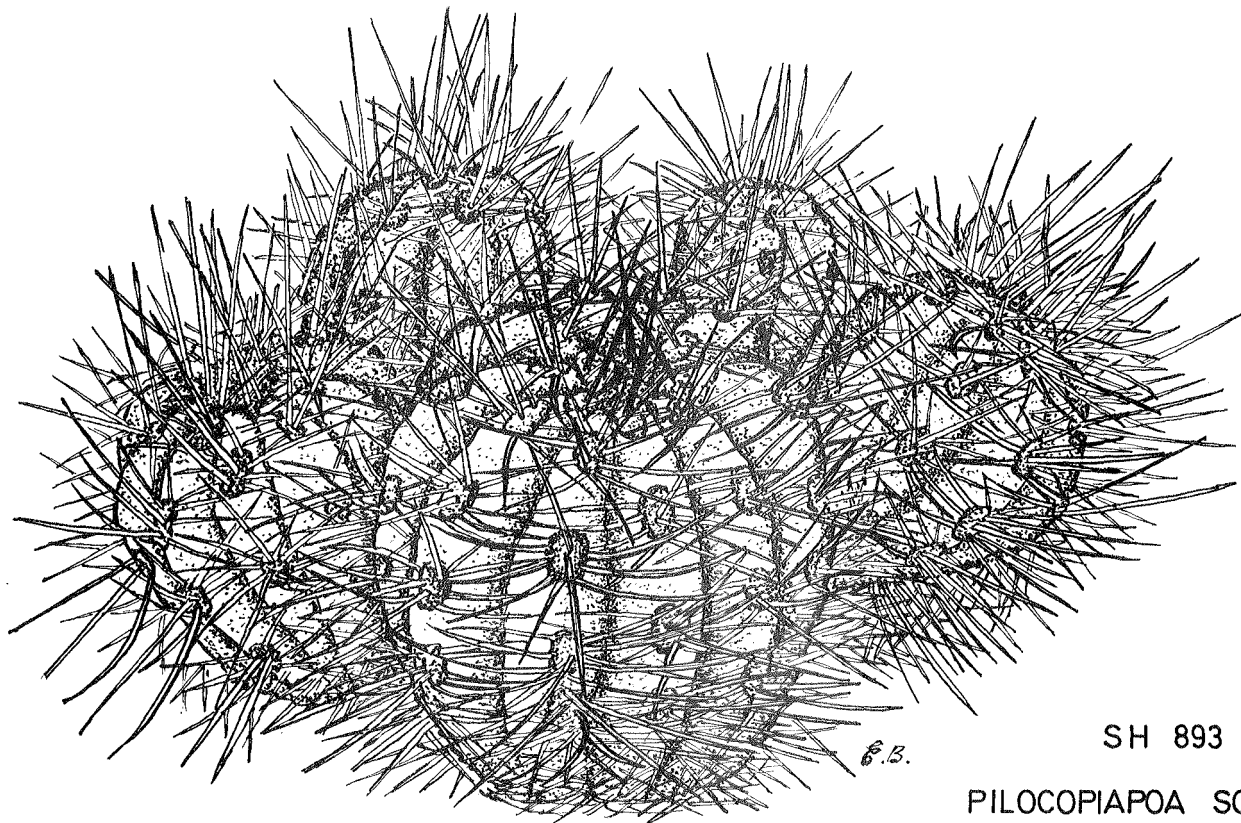


# THE CHILEANS '70

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SH 893

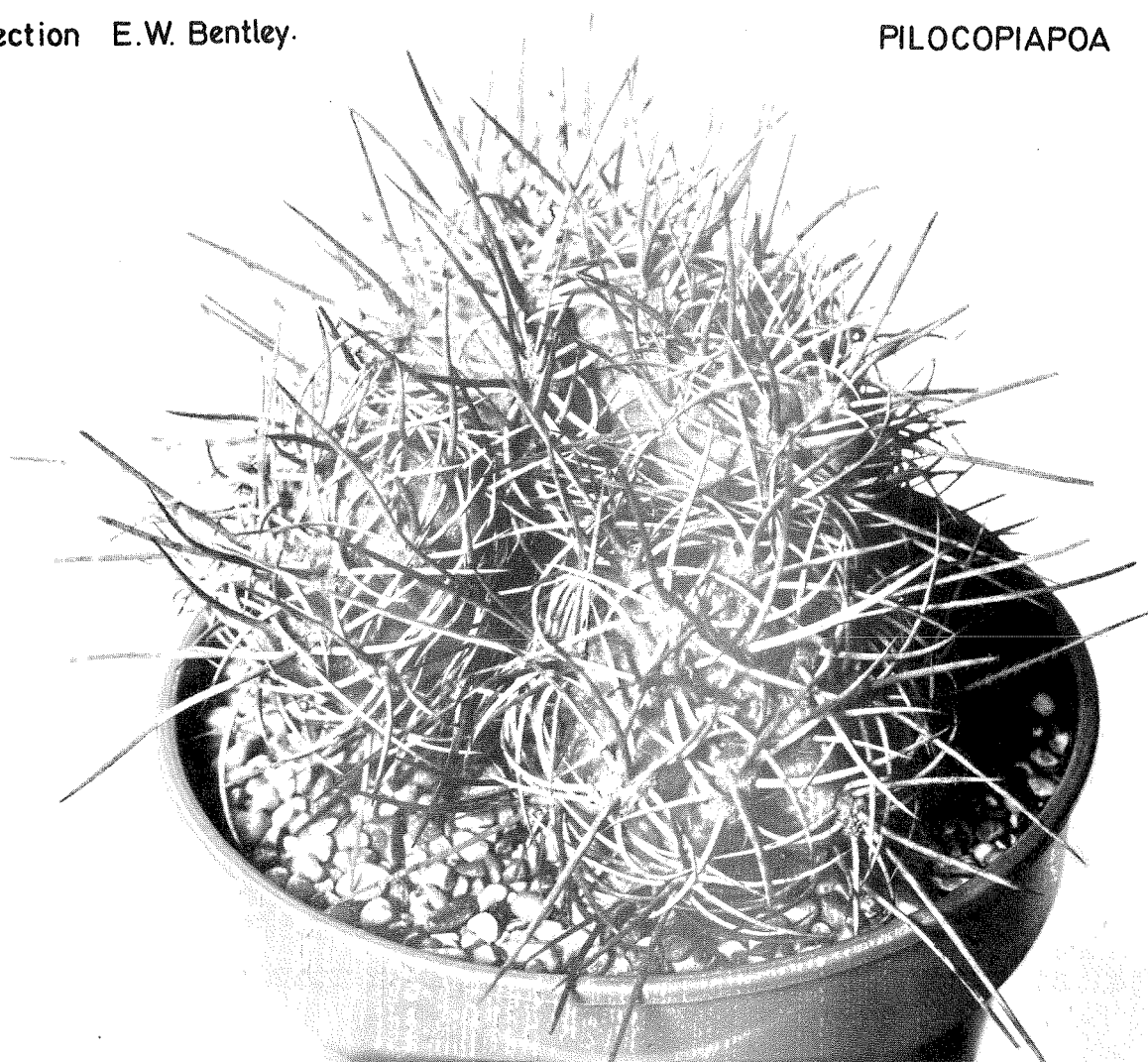
PILOCOPIAPOA SOLARIS

Half full size.

Collection E.W.Barnes.

PILOCOPIAPOA SOLARIS

Collection E.W. Bentley.



PILOCOPIAPOA SOLARIS Ritter gen et spec. nova by F. Ritter.

(Translated by E.W. Bentley from K.u.a.S. 12. 2. 61).

Globosa, dein subcolumnaris, corpore duro, vertice tomentoso, undique prolifera, cumuli usque ad 1 m alti et 2 m traversi, rami 8 ad 12 crassi, cinerascens-virides; costis 8-11, 2-3.5 cm altis, obtusis rectis non tuberculatis; areolis magnis (1 cm excedentibus), suborbiculatis, tomentosissimus, approximatis; aculeis validis, marginalibus et centralibus, rectis vel curvatis, fulvis, dein cinerascens, radialibus 7-10, centralibus 2-5; floribus ex vertice, 2.5-3 cm longis; ovario paucis squamis angustis et pilis tomentosis copiosis instructo, fere aequaliter partitis, globosis, 0.75 - 1 cm diam., ca 10 squamis, 0.75 - 1 cm longis et 0.5 - 1 mm latis ferenti, in fructu siccis et pungentibus; camera nectarifera 2-3 mm longa, 3-6 mm lata, semiaperta; longitudine tubi maxime quarta parta floris (Copiapoa longuis), tubo infundibuliformi, 4-7 mm longo, squamis angustis et pilis tomentosis copiosis instructo; staminibus brevibus (Copiapoa longioribus), 5-8 mm longis, albis vel viridulis; stylo albo vel flavido, 1-1.3 cm longo, stigmatibus 4-8; petalis flavidis vel rubidis, 1.25-1.5 cm longis, 3-5 mm latis; fructibus superne per opercula aperientibus, globosis, 1.5 cm diam. inferne tenuioribus, viridibus vel rubris; seminibus nigris, nitidis, subtuberculatis, hilo ventrali (Copiapoa hilo subbasali), 2 mm longis.

Patria: Chile borealis, zona occidentalis.

Coll: Fr. Ritter FR 541

Typus: Herbar der Universitat Utrecht, Nederlande.

Body rounded, later elongated, very hard with a woolly crown, strongly sprouting and forming hemi-spherical clumps, with numerous fairly compact heads over 1 m high and up to 2 metres in diameter, without tap-root, single heads 8-12 cm. wide, grey-green, not rimed. Crown flat covered with wool, spiny.

Ribs mostly 9-10, rarely 8 or 11, straight, blunt, unhumped widened out at the base, 2 to 3.5 cm. high.

Areoles nearly round, 10 - 17 mm in diameter, somewhat raised, with thick long felt that is yellowish-brownish at first and goes grey, up to 5 mm distant from each other, in old heads nearer together to touching.

Spines light yellowish-brownish when new, tips only a little darker, going grey, stout to very stout, rigid, straight or bent, sometimes claw-like, particularly in young plants, the curvature preferably downwards. The surface of the spines is more or less fibrous and often flakes off. About 7-10 outer spines, directed sideways to somewhat erect, from 15 - 50 mm long, centre spines 2-5 irregularly positioned, from 2-6 cm. long.

Flowers from the crown, opening in the daytime, quite long, 2.5-3 cm.; they have the same characteristic scent as many Copiapoa flowers (which however many other cactus flowers also have).

Ovary completely in the long areole wool, roundish, 7 - 10 mm long and thick, greenish-white or pink, with about 10 long and very slim scales from 7 to over 10 mm in length and only 0.5 to 1 mm broad, evenly distributed over the whole ovary; the lower scales green, the upper red, green at the base; later the scales dry on the fruit and become sharp at the tip. In the scale axils very thick, about 15 mm long, white wool of a consistency like that of the areole felt. Without strong hairs or bristles.

Nectar chamber 2-3 mm long and 2 to 3 mm broad, making up almost half of the perianth tube, half-open, whilst about it is somewhat concealed only by the lower ends of the filaments.

Tube only ca. 1/6 to 1/4 of the flower length, the tube wall is thicker than in all Copiapoas, funnel-shaped, about 4-7 mm long, on the outside with numerous, long pointed scales over 10 mm long but only 1-2 mm wide and similar white wool to the ovary.

Filaments inserted on the whole tube above the nectar chamber (as in Copiapoa) bending towards the stigma, less than one third of the flower length, only ca. 5-8 mm long, extending only to the base or up to half the length of the petals, white to light-greenish. Anthers cream placed at varying heights.

Style white or yellowish, short, only 10 - 13 mm long including the 4-8 light yellow to orange coloured leaning-together stigmas that are about the same level as the anthers.

Petals carmine pink to pink-yellow to light yellow or yellowish white, 12 - 15 mm long and 3 - 5 mm wide, rounded above, the outer ones redder and more pointed. They are more parallel than spread out since they are mostly prevented from spreading properly by the strong spination.

Fruit green to red, 15 mm long, 15 mm thick at the top of the fruit-bowl tapering downwards, with very broad fruit bowl on the rim of which are small swollen crenellations with firmly attached flower remains. For scales and wool see under ovary. The wall of the fruit is twice as thick as Copiapoa, ca 2-3 mm. At ripening the fruit opens at the top by a 1.5 mm thick lid formed from the floor of the perianth and meeting the side walls of the fruit in a circle. The ripe, thick, white, seed strings (funicles) only a few mm long (the fruit flesh) are somewhat juicy and attract ants which distribute the seed. (Opening of the fruit, fruit flesh and seed distribution as in Copiapoa).

Seeds about 2 mm long,  $1\frac{1}{3}$  mm broad,  $\frac{2}{3}$  mm thick, black, smooth, basal part rounded when young. Surface with flattened fine little humps. Hilum very much at the side,  $\frac{1}{3}$ - $\frac{1}{2}$  mm below the basal end, in appearance round, in side-view strongly indented, white. The surface on both sides of the hilum somewhat depressed.

Type locality: El Cobre on the North Chilean coast, east of the mist-zone.

Distribution: In the hinterland of the North Chilean coast around 24 lat. The species avoids the region of the coastal mist and grows higher up and further inland, where the sun shines almost all the time and almost no rain falls. It should be said that nearly all the northwest Chilean cacti are dependent on the coastal mist as the almost sole provider of dampness. Further inland from there, where all other cacti go to ground from the aridity and where all young plants die of thirst, even if a seedling comes up (because the mist doesn't reach so far, there begins the kingdom of this cactus, where at its most luxurious, it occurs in giant clumps). One can perhaps assume that this genus previously will have had a much wider distribution, but with the increasing drying out of North Chile, has gone to ground, till it is dependent on the sunny climate of the deeplands and not on the mist climate (and at the same time this sunny region of N. Chile has become a complete desert), and that only this small relict remains, which manages as best as possible to defy the aridity.

Systematics: This monotypic genus stands next to Copiapoa Br. & R. The woolly flower with the slender evenly distributed scales shows that the genus originated with Copiapoa and in any case was a fore-runner of this genus.

I set out here the chief differences between Copiapoa Br. & R. and Pilocopiapoa Ritt. gen. nov. against one another. (Bracketed are the characteristics in which the genera are not different throughout).

Copiapoa Br. & R.

Body: very variable, hard to soft, grass-green to almost white, high-ribbed non-humped to ribless tuberculate, single, a few centimetres diameter and level with the ground to over 1 m high bodies or up to large clumps, root a tap or tapless.

Ribs: 8 to 47 in normal forms, excluding cristates.

Spination: strong to spineless.

Areoles: Less than 10 mm diameter.

Ovary: scaleless or with a few broad, triangular scales only or almost only on the receptacle wall. Axils completely naked.

Perianth tube: at least  $\frac{1}{3}$  of the flower length, wall thin naked without, with a few broad scales.

Stamens: at least  $\frac{1}{3}$  of the flower length.

Fruit: clothed as for the ovary, scales stay soft and juicy. Wall thin. Edge of the fruit bowl without thickening.

Pilocopiapoa Ritt.

Body: hard, grey-green, high ribbed, unhumped, giant clump forming, tapless root.

Ribs: 8 to 11

Spination: very strong.

Areoles: over 10 mm diameter.

Ovary: with a few long very slender, almost uniformly distributed scales in the axils of which is very long and thick wool.

Perianth tube: at the most  $\frac{1}{4}$  of the flower length, walls twice as thick, with many small scales without. Axils with long wool.

Stamens: less than  $\frac{1}{3}$  of the flower length.

Fruit: clothed as for ovary but the scales become dry and spiny at the tips. Wall twice as thick. Edge of the fruit bowl with slightly thickened rim.

Copiapoa Br. & R.

Seed: tuberculate to smooth, black to red-brown, very small (0.5 mm) to large (2 mm).  
Hilum: oval, without deep indentation of the seed coat, sub-ventrally at the basal end.

Pilocopiapoa Ritt.

Seed: flat, tuberculate, black, large (2 mm).  
Hilum: round, within an indentation of the surface of the seed, ventrally below the basal end.

COPIAPOA CONGLOMERATA (PHIL.) COMB. NOV. LEMBCKE by Hans Lembcke  
(Translated by E.W.Bentley from K.u.a.S. 17.2. February 1966).

syn. Echinocactus conglomeratus Phil. Flor. Atac. 23: No.144. 1860  
Copiapoa ferox Lembcke et Bckbg. Cactac. Bckbg. 1959  
Pilocopiapoa solaris Ritt. Kakt. u. andere Sukk. S.20. 1961

In the view of Philippi's species list I also gave under each the exact location of Echinocereus cinereus and Echinocactus conglomeratus. It will be seen that E.cinereus must extend between the coast and valley near Taltal to El Cobre. From this it must be assumed that Philippi has included in E.cinereus the marginata-like species of Blanco Encalada and C. haseltoniana. He must have known these plants. Today we know that C.cinerea occurs no more 10 to 15 Km south of Paposo yet however is still distributed south of Taltal.

Philippi has no longer included in it the large Echinocactus of El Cobre and has described it as a new species. The description reads:

E.globosus, conglomeratus, viridis, globis circa 15-25 lin. crassis, viginticostatis; aculeis 8, stellatis, mediocribus; aculeis centralibus, superiores 3 vel 4 peripheriae aequantibus; floribus pulchre citrinis.

If the description is couched in general terms it is still clear in respect of the attribute "conglomeratus". The clumping together of many bodies in one plant is in this species more typical and more striking than in any other species of the genus, including E.cinereus, which Philippi certainly knew well.

About the station was given: "Aparace con frecuencia en los rocas de la costa entre Chaguar de Jote, a unos 24° 24'1.m y el Cobre" (Occurs frequently between the coastal rocks between Chaguar del Jote and El Cobre from 24° latitude southwards to the extent of 24 minutes).

As I was able to establish, only one species occurs near El Cobre and therefore perform it can only be the species described by Philippi even if the species really occurs infrequently between the coastal rocks.

Although Ritter has described this species accurately and in detail, may I do this also as at times my observations do not coincide with those of Ritter and it is appropriate that this species now should be clearly determined.

Description

Flower: 20 to 30 mm long, petals mostly yellowish, but occasionally also reddish, like C. streptocaulon and C. applanata. Length of the petals ca. 14 to 15 mm, pistil and stamens light yellow.

Fruit: At first green, when fully ripe reddish, later drying and then light yellow. In contrast to other Copiapoa species strong-walled and on the outside rough and uneven. Scales numerous and sharp and in the dry state stiff and prickly. The fruit remains in the crown wool as in all Copiapoas. At ripening the upper part opens or tears open and ants carry off the seeds. The process of opening does not always proceed smoothly; one finds for example deformed fruits. The seeds and fruit are larger than in other Copiapoas.

Habit: Strongly sprouting, building large groups and heaps, often of hemispherical shape and up to 1.80m dia. Single branches ca. 100 mm dia., crown wool light, number of ribs variable, about 10, areoles large and felted, spines light to yellowish, going grey in old age, very strong and long, mostly straight or gently curved. Up to 10 outer spines, centrals often several ca. 3-5 and up to 50 mm long.

Locality: South of the 24° latitude between Blanco Encalada and El Cobre near the coast, and clearly more in flat places than between rocks, not directly near the sea but still within reach of the coastal mist. I have visited the locality three times and once experienced morning mist and twice evening mist. Besides I have several times observed from the air that the coastal mist in this area drives inland for about 10 Km. This determines the eastward spread of this species. Ritter takes the view that this species keeps clear of the coastal mist. This does not accord with my observations and also would not be possible, for there is no possibility of life for plants outside the mist zone in this neighbourhood. It should also be noted in this regard that C. conglomerata occurs near Blanco Encalada together with other cactus species and even with another Copiapoa, a Neoporteria and a Eulychnia. As is well known the Eulychnias especially with their long spines are decidedly typical mist-zone plants. I was made aware of this Copiapoa species of Blanco Encalada and El Cobre in 1958-9 through the German consul, Herr Carlos Schafer of Antofagasta. I visited the locality at Blanco Encalada for the first time in company with Herr Schafer. I was so impressed by this species that I informed various experts about this find. Together with Backeberg the species was then described as C. ferox. For a long time I could not catch up with Ritter's description, in which he described his Pilocopiapoa, for I had not yet been to El Cobre and our C. ferox was for me none other than a Copiapoa. Because the road to El Cobre was blocked by a landslide, for a long time I could not go there. In 1964 I was again in Blanco Encalada and then for the first time in 1965 near El Cobre. Along with the young Chilean botanist Pablo Weisser I was able to establish that the plants from Blanco Encalada and El Cobre were the same species. It appeared to us that C. conglomerata near El Cobre was much larger than near Blanco Encalada.

I cannot share the view that the species belongs to a monotypic genus. In growth form C. conglomerata is a typical Copiapoa and resembles C. carrizalensis. The structure of the flowers and the fruit is likewise consistent with this genus, even if the thick walls and unevenness of the fruit and also the size of the seeds are exceptional. The flower colour is yellow, with a tendency to a reddish tint, which is also the case in some other Copiapoa species. One must interpret the genus Copiapoa in such a way as to include the giant plants of C. conglomerata and the dwarf plants of C. humilis. Up till now there has been little to dispute about in this genus and one should leave it as it is.

#### Comments on Copiapoa conglomerata from E.W.Bentley

I was very pleased to see the article by Lembcke. I had already felt that there was no need to recognise the genus Pilocopiapoa as it is quite unnecessary and having read Lembcke's argument I am quite happy with conglomerata.

What I do find strange is that Lembcke, in sending his plant or his description of C. ferox to Backeberg, did not make it clear that the species occurred in large clumps. The original description in Die Cactaceae does not even mention the sprouting characteristic! Only later, in the Lexikon, does any reference to sprouting get worked in. Maybe it clumps at El Cobre and not at Blanco Encalada - but Lembcke does not say so: he only refers to conglomerata being larger at El Cobre.

Also surprising to me is the statement that conglomerata resembles carrizalensis.

My plant, received as Pilocopiapoa solaris, was treated like all plants without roots - whether imports or scions just cut off a stock. I plaster all cut or damaged parts with Boot's rooting hormone (which contains a fungicide) and even plaster undamaged roots with it - and then stick the plant on or in damp gritty compost. And then I spray whenever I happen to go past with the spray gun - with water at greenhouse temperature. I have had virtually no failures with this method - and I had quite a few when I used dry heat, etc.

I have some Knize seedlings received as *C. ferox* and one, now grafted on *Pereskioopsis*, but only small pea sized, is quite different from any other *Copiapoa* seedling I have seen in that it looks almost spineless. The areoles are widely spaced and have tufts of hair, almost hiding the very short spines.

. . . from R. Ginns

My own plant of this species was raised from amongst the first lot of seeds collected by Ritter so it is about ten years old. It has grown very slowly and is still only about 50mm in diameter whilst *Copiapoa haseltonii*, sown at the same time, is 120 mm in diameter. As a seedling it is much less heavily spined than the plant in the photo. It is in no hurry to offset and so far has only produced one tiny offset at the base. There is, so far, little wool in the crown. This is apparently found in all *Copiapoas* before they flower.

My plant was badly scorched in early May when I was away from home. Scorching was round the base and it seems to be recovering. All *Copiapoas* were marked but not killed. The bigger the plant, the worse the damage. Dozens of other plants were actually killed; the worst affected were *Matucanas*, *Parodias*, and *Oreocereus*.

## MATUCANA IN FLOWER

In commenting upon the plants in the *Loxanthocerei* group (Chileans No.16 pp 9-10) John Donald observed that 'flowers on *Matucana* and *Submatucana* vary from extreme zygomorphism e.g. *M. paucicostata*, to none e.g. *M. aurantiaca* with an almost perfect tubular flower'.

During a visit to the collection of E.W. Maddams in the South of England in October 1969, a plant of *M. aurantiaca* was seen which was in full bloom at that time. Like many *Matucana* flowers, the bloom gave the appearance of being only partially open, but it is unlikely that the inner petals would open any further. The flower petals and the tube were virtually on uniform colour, again very like other *Matucana* flowers where the petals and tube may be either red or orange in colour; this flower was quite a rich yellow colour, with traces of red on the edges of the inner petals.

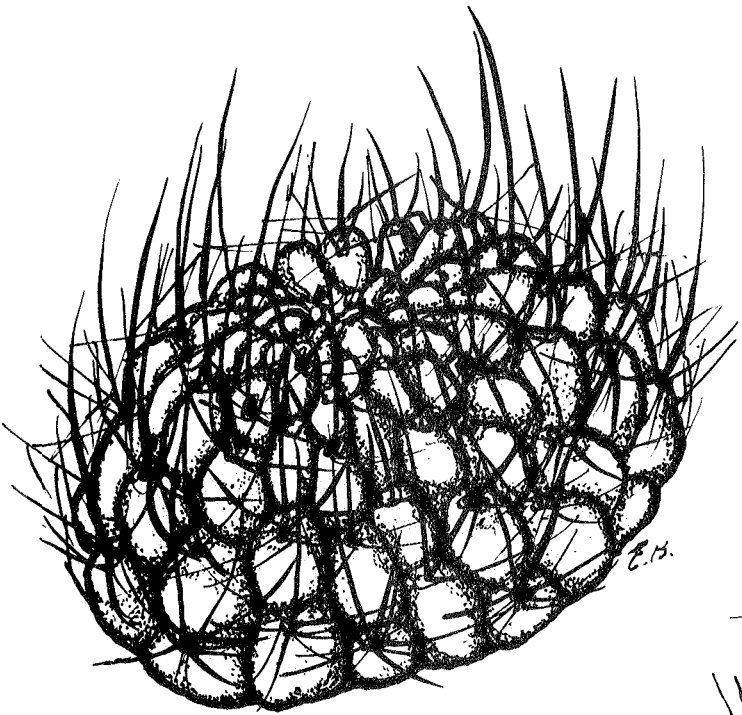
Probably the most striking characteristic of the flower, in comparison with almost all other *Matucana* blooms seen previously, was its remarkably stout proportions. The tube would be about 10 mm in diameter and the flower was about 35 mm high, thus giving it a distinctly tubby appearance whilst it was also quite upright and cylindrical, just as John Donald indicated.

It was not the actual sizes which seemed in any way remarkable, but simply their proportions, a reaction which may be ascribed to having had only one *Matucana* flower in my own collection and that one being a *M. paucicostata*. The flower on that plant was remarkably long and slender - probably about 60 mm long and 6 mm diameter, with a clearly zygomorphic outline. Other flowers have been seen on other species of *Matucana* on our Continental Cactus Tours, some as long as 60 mm and some shorter, but all would be described in general terms as slim rather than stout. Hence the reaction of surprise on seeing such a stout flower on *M. aurantiaca*.

A colour print from D. J. Lewis of *M. aurantiaca* in flower in his collection exhibited an equally stubby bloom, but with an obvious difference in shade between the flower petals and the tube. The flower petals were perhaps a deeper and richer yellow in comparison with the pale yellow tube although it is possible that this might be accounted for to some extent by the fact that the flower had probably started to wither. Commenting upon this particular photograph, G. W. Sykes observes 'My first thought was that it was not a *Matucana* flower; however, on further study I concluded that it was probably typical of *aurantiaca* about to wither. I would agree that this seems shorter and more stubby than others described and indeed not like mine at all, which flowered again in early October. My own observations showed a lengthy tube, distinctly zygomorphic. The style was not immediately exerted, but did so quite markedly on about the second or third day. In the process of withering the style and stigma withdrew into the perianth and the petals assumed

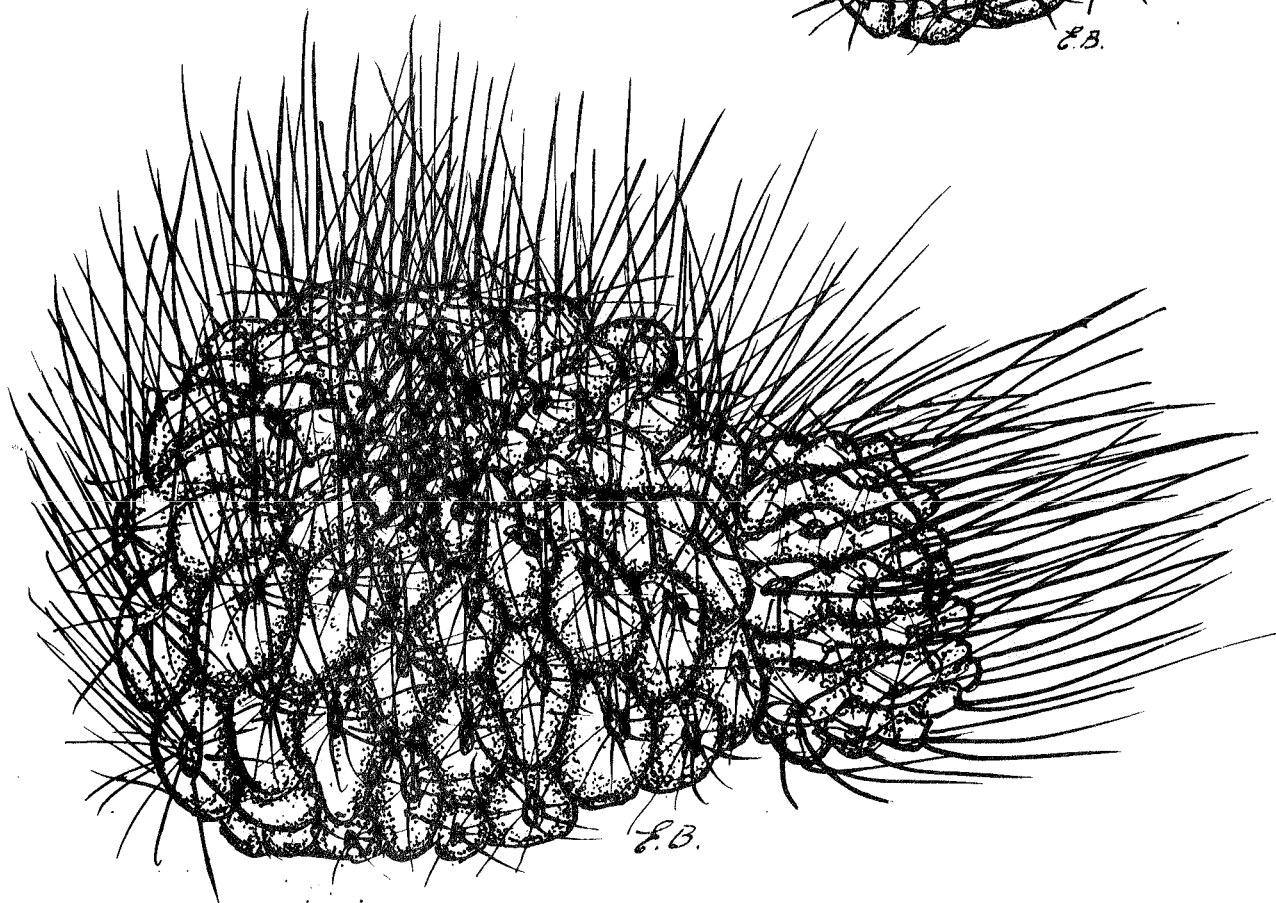
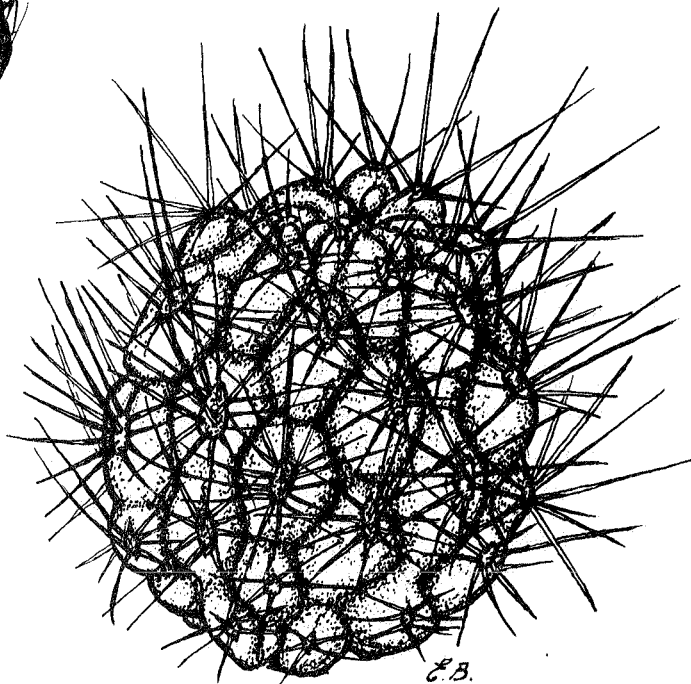


Collection - E.W.Barnes.



SUBMATUCANA  
CALVESCENS  
SH 172

SUBMATUCANA  
CURRUNDAYENSIS  
SH 171



D.W.S 47 SUBMATUCANA AURANTIACA



a somewhat bedraggled and irregular appearance, akin to the flower on David Lewis's photo.'

A slide taken by G.W. Sykes of his *M. aurantiaca* in flower showed a bloom with the outer petals completely wide open - indeed the tips were even reflexed downwards - whilst the innermost petals were only partially open in typical *Matucana* fashion. The body is typical for this species but it is notable that the flower should show zygomorphism rather than be cylindrical.

Also with a plant in flower last autumn was A. W. Mace who observed "I think we may be rather lucky on the south coast as the *M. aurantiaca* owned by a fellow-collector nearby has in previous years flowered from around September-October onwards towards Christmas and even after. My own plant, grown from Winter's seed in 1962, is flowering for the first time this year, after having moved to a much lighter site for my greenhouse. The flowers seem to me to be slightly zygomorphic but certainly much shorter and stouter when compared with the dimensions for *M. paucicostata* - more like the colour photo of D. J. Lewis's plant. I find that particular photo very interesting, the flower colour is very much deeper yellow than ours and the tube a much lighter colour; the plant itself is very similar to mine.

My plant is now about 60 mm high and 80 mm across the body, with 14 humped ribs. The areoles are about 10 mm apart on the ribs, with off-white wool. The spines are all straight and a dark golden colour, there being about 6 centrals up to 25 mm long and about 20 radials about 10 mm long. The flowers were 60 to 70 mm high and 30 mm across when wide open. The flower colour was orange but the tube was greenish. The stamens were orange, the stigma green with six lobes. The flower lasted for four to six days. I put the plant 'to stud' so to speak with that of my fellow collector, transferring pollen from each to the other and fruit has set on both".

With the advantage of a more suitable climate for cacti, Mrs. L. E. McIntosh writes from New Zealand "My own *aurantiaca* was in the process of flowering when I received the colour print taken by D. J. Lewis. This print corresponds fairly well with my own flowers, the difference is that mine have carmine edges and tips to the petals - the tube is pale lemon, the scales greenish with fine curly wool, petals lemon shading to orange, edged and tipped carmine, stamens cream at bottom shading to orange and carmine at top, pollen yellow: stigma same colour as stamens with four small green lobes. The stigma protrudes before the flower opens and the stamens stay in a tight bunch around it, never spreading.

"I have noticed this latter characteristic in all the flowers on my *Matucanas*. There is only a slight slant to the flower head on *aurantiaca* - this is also the case with *M. crinifera*, but all my others really are zygomorphic. The thickening of the tube also appears in *crinifera*, whilst the remainder of my flowering species have long slender tubes.

"By the second day of opening the outer petals are all curled back - this is something that may not happen in your climate; these plants really like the sunshine - I have noticed that when blooming in dull weather they remain rather like the colour print, with the outer petals less curled back. This curl back at the tip of the outer petals is not the case with all my 15 flowering *Matucanas*; they do all open wide, however *M. intertexta* is one I can bring to mind which retains the straight petals.

"To me *M. ritteri* is the finest of them all - I have had this one flower at the size of a florin. The length of the tube is about on a par with *M. aurantiaca* but very much more slender and the flower is very sharply bent; the tube is brick red, the petals carmine edged and tipped with violet, stamens carmine, stigma carmine with green lobes."

Also successful with *M. aurantiaca* is N.W. Ivory who observes "I have a plant of this species which first flowered for me when four years old from seed and it is now larger than my older plant of *currundayensis*. I find that this latter species starts to bud up in October but the buds abort over the winter".

A little more successful with this latter species in one season at least, was G.W. Sykes who comments "My *M. currundayensis* flowered in the late autumn of 1968, with a salmony pink flower, being approx. 20 mm across. The anthers, bunched closely around the style, projected quite clear of the petals. The flowers are relatively long lived, up to a week, usually succeeding each other

singly and remaining partly open at night. I stimulated a newly opened bud with pollen from the previous flower which resulted in one fat fruit. Speaking from memory, the fruit was plain, greenish, firm, slightly scaly, containing semi-dried pulp and many seeds. I was able to harvest the seed in about 6-8 weeks from setting the fruit. I did obtain viable seed, some of which I sent to the Chileans seedling exchange and four of which germinated for me.

"Other buds formed on both this species and *aurantiacum* in the autumn of 1969, some of those on the latter species came into flower but the remainder and all those on *M. currundayensis* did not mature. I ascribe this to the shading which I found necessary this year as protection against the unprecedented scorching of midsummer. Probably clear glass, a little extra water and warmth would bring the buds out".

From New Zealand Mrs. E. M. Gradon describes her *M. currundayensis* as "having three centrals, 20 mm long, with 11-12 radial spines a little shorter and standing at 45° away from the body, all of a gingery colour". It is of interest to compare this description with the accompanying sketch by E. W. Barnes of an imported plant ex-Sargant, which exhibits just the same characteristics. Mrs. Gradon describes her flower as being "only very slightly oblique, having broad peach-pink inner petals, darker at the tips and edges, the outer petals being narrow, with a green mid-rib shading to peach-pink at the edges. The tube is about 40 mm long; the stamens are cream coloured at the base running up to peach-pink towards the top, with cream anthers; the pistil is greenish-cream, the stigma green with five lobes."

Indeed, the frequency with which the observation 'green stigma' appears on *Matucana* flowers leads one to feel that it may perhaps be as characteristic of this genus as it is of the North American *Echinocereus*. A quick consultation of the *Kakteenlexikon* yields the following *Matucana* with green stigmas - *ceroides*, *crinifera* (pale green or golden yellow), *elongata*, *haynei*, *hystrix*; *yan-ganucensis* is given as a yellowish stigma whilst its variety *albispina* is quoted as having a violet-carmine stigma and var. *longistyla* as violet. In *Submatucana* we find green given for the stigma colour of *aurantiaca* (yellow-green) whilst *madisonorum* is given as yellowish and *ritteri* as yellowish to red - green.

On this green stigma Mrs. L. E. McIntosh comments "these green stigma lobes occur in a few of my plants; *M. intertexta* has very large ones quite green and very fluffy".

But just as we find some *Notocacti* with yellow rather than with the typical reddish stigma, it would seem that there are some *Matucana* which do not have a green stigma; perhaps even some of those species which normally exhibit a green stigma may also sport and occasional one or two of yellowish hue. Any confirmations or contradictions would be welcome.

There would also appear to be some variation in the colour of the flower tube on *M. aurantiaca*, for both the plant observed in the collection of E. W. Maddams and that flowered and photographed by D. J. Lewis, had a clear yellow tube with but the faintest (if any) suggestion of green in it; whereas the slide taken by G. W. Sykes of this species and the flower described by A. W. Mace both had distinctly greenish tubes.

If we are to refer to the description given for *M. aurantiaca* in Backeberg's *Kakteenlexikon*, we find no mention of the tube colour. The flower petals are quoted as edged dark-red, becoming orange yellow towards the centre and foot. This is not a strict translation from the entry in *Kakteenlexikon* but an interpretation of the very brief entry there, made possible only by referring to the description given in Backeberg's "Die Cactaceae" in much less telegraphic style.

Describing the flowers on her *M. currundayensis* and *intertexta*, Mrs. Gradon observes that both flowered in January. This would suggest that these plants have a certain affinity with *Neoporteria* in their flowering times. The pink-flowered *Neoporteria sensu stricta* flower in the period October to March in New Zealand, whilst in England they attempt to flower in these same months but usually manage to do so only in autumn or early spring. It would seem that the *Matucana* also flower over these same months both in New Zealand and in Britain. Writing in the New Zealand 'Southern spine' for June 1965, M. E. Shields describes *Matucana* as 'amongst the earliest to flower in spring, some coming into flower in early winter'. In Britain they would seem to flower mostly in late autumn and sometimes in early spring.

The three *Matucana* illustrated here are ex D. Sargent and they are described by E. W. Barnes as follows:-

"M. aurantiaca. Body pale green and very shiny, spherical with a rather flattened top, sparingly offsetting with age (offsets appearing part way up the plant body).

Ribs 15 to 20, notched into large, rounded tubercles 15 mm wide and 20 mm long with a distinct 'tooth' beneath each areole which becomes progressively horny with age.

Areoles elongated and tapering to a point at the upper part, 5 mm wide and 15 mm long (or slightly less long towards the apex), felted; pale brown passing to grey brown with age, the upper third devoid of spines.

Spines with thickened bases at first very pale brown, almost hyaline with the odd darker spine here and there. Later mid-brown with a dark brown base or zoned. Radials 15 - 25 thin straight and radiating, 10 to 20 mm long. Centrals 9 - 12, stronger with a distinctly thickened basal node, twisted or slightly curved, 30 to 50 mm long.

M. currundayensis. Body dark green and shiny, usually club shaped and elongated.

Ribs 11 - 20 notched in to tubercles 10 mm wide and 15 mm long.

Areoles 4 mm wide by 5 mm long with pale brown felt passing to grey with age.

Spines with slightly thickened base, mid brown passing to dull, dark brown with age. Radials straight, radiating, sometimes slightly curved against the plant body, 12 to 15 in number, 10 to 20 mm long. Centrals 3 to 5, slightly stronger, 20 to 30 mm long but occasionally up to 40 mm long.

M. calvescens. Body pale green, shiny, hemispherical.

Ribs slightly spiral 13 - 18 notched into rounded tubercles 15 mm wide and 10 mm long; the 'tooth' beneath is almost non-existent.

Areoles 8 mm long and 5 mm wide at first with much pale brown or creamy brown felt, passing to whitish grey with age.

Spines at first very pale later very variable in colour from one plant to another; from dark brownish red through reddish to palest brown, all spines later having a pronounced greyish tinge. Radials 12 - 18 curved and flattened against the plant body with a darker thickened base; from 5 to 20 mm long. Centrals 5 - 7 stronger straight with a dark well pronounced basal node; 20 to 30 mm long.

All three are recognisable enough, *M. calvescens* being the most distinctive of the three as it has shorter, curved spines and much more rounded tubercles and it also comes in a variety of spine colours, the reds making it stand out even more from the other two which appear never to come in this colour, only shades of brown. *M. currundayensis* is distinctive in that it becomes semi-columnar with a club shaped head and appears to be a smaller growing species. But smaller plants that have not begun to elongate do resemble a smaller growing *aurantiaca* in some ways".

A problem in cultivating *Matucanas*, which seems to be fairly common in Britain, is their tendency to brown and shrink at the base of the body. N.W. Ivory has tried decapitating plants above the shrunken basal part and rerooting them, only to find that in time the lower parts shrink and mark again. E. W. Maddams also finds the brown colouration round the base of the plant stem unsightly especially when it rises up the stem and becomes more noticeable with age. The writer even finds this happens with grafted plants of *Matucana*.

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We have slides of *M. intertexta* and *M. aurantiaca* in flower in the slide library. I should be pleased to hear from any members who have slides of other species of *Matucana* - preferably in flower or fruit - who might lend them for copying for the slide library - A.W.C.  
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(Translated by E.W. Bentley from K.u.a.S. 21.3.70.)

A good and detailed description of this fine plant may be found in "Krainz, Die Kakteen" for 1.12.59. I agree with the observations made there - also with regard to the validity of *Frailea castanea* Bckbg - and would like here to comment from my own experience of my encounter with this species.

(Backeberg had included the name *F. asterioides* as a synonym of his earlier described *F. castanea*. However, *F. castanea* was regarded by Werdermann and by Krainz on good grounds as a nomen dubium, (doubtful species) - K.u.a.S. Ed.)

As a foreward, note that Harry Blossfeld in 1936 produced first of all *F. asterioides* Werd. from Alegrete in Rio Grande do Sul, Brazil. From then onwards, no more plants came to us from this area. Only later Ritter and Horst, and in 1967 Horst and I, found a number of plants again.

*Frailea castanea*, according to Backeberg, was collected by Mueller Melchers in N. Uruguay. In January 1967 Horst and I collected in the Cuchilla Negra in the north of Uruguay, very carefully. Years ago this area was indicated to me by Mueller Melchers as the discovery place of *Notocactus caespitosus* (Speg) Bckbg and of *Frailea* species. From Tacuarembó onwards we scoured the Cuchilla de Haeda and the Cuchilla Negra as far as the Brazilian border. We found only infrequently here and there a few *Fraileas* but nothing that resembled *Frailea asterioides*. They were certainly dark-coloured but had a quite different spination. Finally we travelled to Quarai, where we arrived in the evening so that we had to overnight there.

Early the next morning we searched the whole surrounding area for cacti, but without success. Our noses ever nearer to the ground, we nearly trod once on one of the small, very poisonous, coral snakes. Finally I am just about crumbling at the knees, yet I must find a *F. asterioides*! Although as it happened..... it was Horst who discovered the first plant .... once one has seen one, however, one finds the next more easily and so I was lucky several more times. The reason for our difficulties was now clear: our arrival had coincided with a very dry, hot, spell. The small plants were dried out and had withdrawn between grass and stones.

By lunchtime in Quarai it was especially welcome to still one's terrible thirst with a couple of bottles of good, well-earned Uruguayan Nortena beer.

Our journey had to continue towards Alegrete, situated 120 Km to the north-east. Quite soon past Quarai, at midday, we found on this stretch quite a number of our *Frailea*, quite accidentally and easily. A little rain had fallen there in recent days. The previously so well concealed plants had been awakened to life and gave themselves away by their large yellow flowers.

Further on, in the direction of Alegrete and round about that town, we found no more *Frailea asterioides*. During our intensive search however, we stumbled upon fine groups of other *Frailea* species with golden-yellow and pink-coloured spines and on an interesting species of the *Notocactus ottonis* group.

The plants vary a lot and I must therefore warn *Frailea* enthusiasts to be very wary of new descriptions or varieties of this genus! Only after careful fieldwork and a good knowledge of discovery places is it possible to do successful work on these small jewels amongst cacti.

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We have in the slide library a slide of *Frailea castanea* with a flower about to open: we would be pleased to hear from any members who could lend slides for copying of any species of *Frailea* in flower or fruit.

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GYMNOCALYCIUM. From the Chileans Robin.

The problem of pollinating flowers on *Gymnos* is taken up by Mrs. L. McIntosh of New Zealand who feels "from observation over a number of years, I am sure that most *Gymnos* are self-sterile and there is no doubt whatever that they do have to have correct fertilisation conditions - the main one being heat, as E.W. Barnes suggests. *Gymnos* cannot grow in full sun, without being cooked, in my greenhouse - I have to shade. The noon heat seems to be needed to ripen the pollen, I think, for I find pollinating very easy in the later afternoon.

I have been experimenting with *G. baldianum* over the last three years - one plant grown from an offset of an original habitat collected plant. This plant - which seems to have an extra row of petals compared with others under the same name - is definitely not self-fertile. Two years ago I received an almost identical plant from Japan - this also proved to be self-sterile. I have cross-pollinated these two plants and set fruit without any trouble. I have now come to the conclusion that a genuine *G. baldianum* is not self-fertile and that any so-called *baldianum* that are self-fertile will be hybrids".

"Following the comments by J. Forest on his *Gymno* fruit splitting on the north side, I have noticed five pods on *multiflorum* all split the same day on the same side - with me the north side, but being the opposite hemisphere I suppose I should be opposite to correspond to *G.B.* - but the location of taller plants on the north side of this particular specimen would shade that side more.

"*G. guerkeanum* is difficult to fruit - the male always flowers earlier than the female - the male flower is the brightest of buttercup against a lemon shade of the female, which also has a tube twice as long as the male.

"All my seed pods seem to split in a green state, without becoming otherwise coloured".

Mrs. Gowan has been "experimenting with Levington seedling compost this year. I planted equal sized seedlings of *G. denudatum* v. *paraguayense* in Levington and in my usual mixture of equal parts of leafmould, peat and grit: those growing in the Levington are almost twice the size of the others. In the same experiments, using *G. gibbosum* v. *nigrum*, those in Levington are three times the size of those in my usual mixture".

In further correspondence Mrs. L.E. McIntosh observes that 'my reference to male and female flowers was in regard to *Gymno. guerkeanum*. I cannot be sure that any difference shows in the plant itself. Although there is quite a difference between my plants, a friend nearby has three male plants which are all almost identical with my female plant. In the female plant the flowers are a lemon yellow, the stamens are very few without the pollen lobes, or just the odd anther but without pollen; the stigma is very long, protruding well out from the plant with large cream lobes. In the male plant the stamens are very numerous, well spread out and simply loaded with pollen; there is a very minute stigma away down in the bottom of the tube. I have tried pollinating this with another male but without results. My male flowers are very much brighter in colour - a real buttercup yellow - but the plant and spines are also more colourful, which has given me quite a lot of thought.

"These plants offset quite freely and I understand that my plant is an offset from an old one originally an imported specimen. My plant is small and flat; the offsets grow under the soil around the body - it is now quite old but less than 2" across. The spines are pressed back on to the body and are rose, yellow, and brown, shading from the large cream woolly areoles. From a batch of seedlings it appears that only about one in ten are female plants. I wonder if all the yellow flowered varieties have this sex complex?

## THE YELLOW FLOWERED GYMNOCALYCIUMS from URUGUAY by Gerhart Frank.

(Translated by R. Moreton from K.u.a.S. 21. 4: 70).

In Uruguay and no doubt also in the bordering parts of neighbouring Argentina, Paraguay, and Brazil a large group of yellow flowering *Gymnocalycium* is indigenous. These are distinguished by certain prominent characteristics and represent a closely related range of forms.

They form relatively small (50-100 mm diameter) flat bodies, offsetting from the base and mostly have spider like adpressed spination. The number of ribs and spines, as well as their length, thickness and form are at the same time more or less variable. Very uniform for all plants of this group, however, are the interior and exterior construction of the flower and the seed structure. As a distinctive characteristic, the "Pseudohermaphroditism", rare within the Cactaceae, is to be noted. This dreadful word indicates the existence of unisexual flowers having definite traces of the other sex. That is to say, one plant has only male or only female flowers; generally, however, this unisexuality is not complete, so that female flowers often have thin stamens, although these are without anthers. On the other hand, one finds that in male flowers there is occasionally an atrophied pistil, without a functional stigma. As occasional exceptions, flowers with both stigma and anthers occur.

To obtain seeds from plants of this group, one needs a male plant and a female plant. The large seeds are galeate (helmet shaped) and for all species from this large area as for all those described as yellow flowered, the internal and external construction is the same.

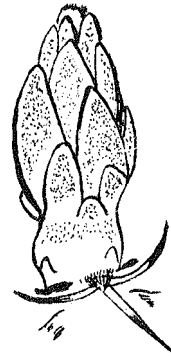
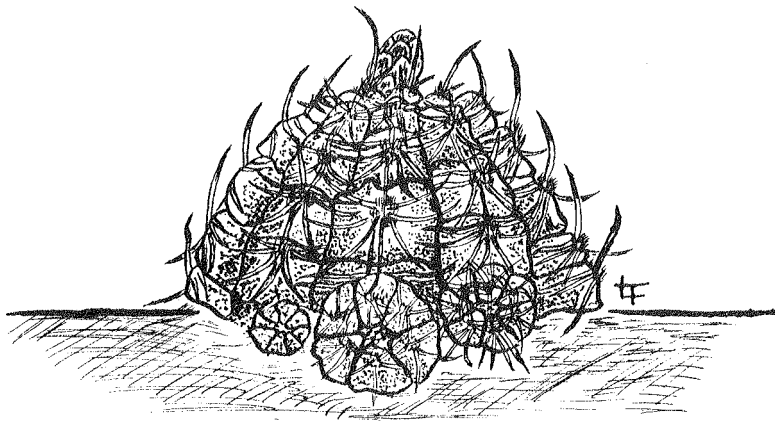
The following species names which belong in this group are known to us from literature and from our collections: *G. leeanum* (Hook) Br. & R., *G. netrelianum* (Monv) Backbg., *G. uruguayense* (Ar.) Br. & R., *G. guerkeanum* (Heese) Br. & R., *G. artigas* Herter and possibly also *G. schroederianum* Osten. Authors such as Schumann, Gurke and others have also included *G. hyptiacanthum* (Lem.) Br. & R. in this group.

With the exception of *G. uruguayense*, *G. artigas* and *G. schroederianum*, flower and seed diagnosis and type localities do not exist for the species mentioned above. As a habitat usually only 'Uruguay' is given, the location being completely missing. Consequently, from the botanical point of view, one element of these yellow flowering *Gymnocalyciums* is insufficiently and therefore invalidly described. They represent in any respect very questionable species.

The recent habitat observations and the results of the collecting by W. Rausch and D. van Vliet show on the one hand very clearly the variability at one location of these *Gymnocalyciums*, on the other hand also, the not very substantial habitat differences by the comparison of populations from separate locations. As the illustrations accompanying my article "Controversies regarding *G. uruguayense*" K.u.a.S. 11/1969 made clear, particular forms are to be found equally at most locations. More especially, comparison of flowers shows a complete agreement in flower construction between plants from different locations.

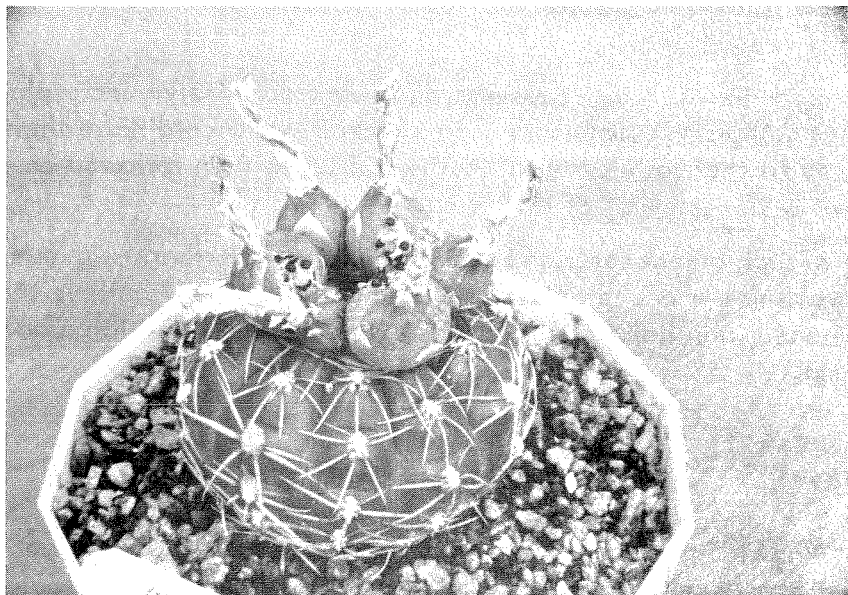
To what extent the pale pink flower colour is related to the location or whether it occurs in isolated cases among the yellow to white flowering majority, can only be cleared up by further investigation on the locations. However, I would like to emphasize that slight variations in flower colour generally offer no taxonomically valuable index. At most, one can indicate a pink or white flowering specimen in a mostly yellow flowering population as a 'forma'. As is well known, flower colour in one and the same individual can change according to the surrounding conditions. Thus I was able to observe in Summer 1969 that all my *Gymno. quehlianum*, which until then had had white to dirty white flowers, uniformly flowered a deep pink. One cannot therefore place much value on the flower colour in judgement of species.

If one wishes, one can identify two marked habitat types among the yellow flowered *Gymnos*. One which comes from the south (Maldonado) and southwest (Salto) is a mostly slender, often long and densely spined form, with numerous ribs divided into rounded tubercles, known in our collections under the names *G. leeanum* and *G. netrelianum*. Beginning in the southerly located Minas,



GYMNOCALYCIUM NETRELIANUM

Collection - T. Lavender



GYMNOCALYCIUM GUERKEANUM

Photograph & Collection - Mrs. L.E. McIntosh N.Z.



through central Uruguay and as far as the Brazilian border are found preponderantly stouter forms, which grow somewhat larger, have fewer more prominent ribs and have much thicker spines. These forms have been introduced into our collections as *G. uruguayense* and occasionally as *G. artigas*. In this range of forms are found flower colours from white to deep yellow as well as pale pink. The latter flower colour was introduced by Fric in his time as *G. uruguayense* var. *floreo roseo* and was later completely erroneously taken by Backeberg in Vol III of *Die Cactaceae* as the type for *G. uruguayense*.

The recent imports from Uruguay as well as studies of the literature now produce for me the following picture: seen from the purely botanical point of view, one can really speak of only one good species, to which the oldest name, *G. leeanum* must be applied. From the practical point of view, however, I find it convenient to accept two species, which are recognisable as two well differentiated types. Geographically they may also, in general terms, as previously outlined, be divided into the more northerly and the more southerly groups.

The south to southwest group should be known as *G. leeanum*, with the synonym *G. netrelanum*. The adjoining group, lying to the north, as far as Brazil, should be known as *G. uruguayense*, with *G. artigas* as synonym. That the latter should be united follows from a very conscientious work of the late Dr. J. Valnicek, to which I myself contributed a small amount of material. In this connection, may I also refer to an article by me which appeared a short while ago (K.u.a.S. 11. 1969) "Controversies regarding *G. uruguayense*".

The species name *G. guerkeanum* is in my opinion to be included, as it is incompletely defined, since the original diagnosis - without flower or seed description or type locality - tells us nothing. It fits equally well either *G. leeanum* or *G. uruguayense*. It was put forward in Heese's time, on the basis of a solitary imported juvenile plant. It is clear that a species description based on a single plant is absurd.

Comparable, too, is *G. hyptiacanthum* Lem., an extremely questionable species and would be better reduced to synonymy, since today it is no longer clear what Lemaire understood under this name. His original contained neither habitat, type location nor flower and seed description. While Schumann and Gurke placed the species with the yellow flowering Uruguayan species, reference to plant material from old specialist collections shows that on the basis of seed construction it is of the *G. gibbosum* group. Moreover, Lemaire also remarked that it resembled *G. gibbosum*.

Study of the literature shows in any case one thing very definitely: incomplete and faulty old descriptions led later authors to supplement these descriptions according to their own point of view and to make them fit their own system. Authors of books then followed on with further plagiarism and sometimes with comments of their own.

Species names with such antecedents and especially without herbarium specimens are, from the botanical viewpoint, not acceptable and should be rejected. I believe that one day a start must be made on each individual genus to check all such unsubstantiated and superfluous names, to free us of them.

#### Comments on Yellow Flowered *Gymnocalycium*s from H. Middleditch

To the best of my knowledge, the Botanical Congress which reached international agreement requiring a Latin diagnosis and deposition of a herbarium specimen to validate any new description after 1935, also accepted validation of any species names then current which did not meet the new requirements. Gerhard Frank will be fully aware of this, which makes his statement that species names 'without herbarium specimens should be rejected' appear a little too sweeping. A very considerable number of well established species would surely be swept into oblivion if this statement was to be taken literally.

On the other hand, there seems to be little doubt that the cactus literature is cluttered with species names which neither study nor exploration have been able to substantiate subsequent to their original appearance. However, great care would be needed in checking these names; we need only consider the example of *G. schroederianum*, which was a suspect species until Buining rediscovered it in Uruguay; on the other hand, more than one species name is based upon a single plant discovered in a European collection.

If we are to accept Frank's premise that this group of plants all exhibit similar flower and seed form and are of a fairly similar (though variable) body habit, whilst flower colour cannot be regarded as a differentiating factor, then one must ask how *Gymno. denudatum* can be separated from this group. Admittedly it is reported to come from South Brazil and the Argentine Province of Misiones, so that the author might contend that this species does not fall within the province of his title; but since both territories adjoin Uruguay, surely this form is encompassed by his opening paragraph? The body habit of *G. denudatum* is comparable with that of *G. artigas* and *G. megalothelos*; the seed of this species - along with all the other species referred to above by Frank - falls within the Denudata group of the Macrosemineae.

Indeed, one feels tempted to enquire where this leaves *Gymnocalycium fleischerianum*, the only remaining species in the Macrosemineae after considering all those mentioned above.

To date, I have had flowers on a *G. guerkeanum* of some 35 mm diameter and a *G. netrelianum* of but 25 mm diameter, which may suggest that these 'yellow flowered *Gymnocalyciums* from Uruguay' will flower when quite small plants.

..... and comments from J.D. Donald

Gerhart Frank and I have been in correspondence over these yellow flowered *Gymnocalyciums* for some time and I concur almost absolutely with his thesis. The only exception is in the treatment of *G. schroederianum* which I believe to be quite separate from this group. This difference of opinion comes simply from the fact that a year ago the existence of the plant was not established and that it was thus a "planta dubia" about which we could only conjecture. It seemed reasonable to include it within the 'uruguayense' group on the basis of conspecificity within the known general distribution of *G. uruguayense*.

However, the rediscovery of *G. schroederianum* by Albert Buining and Leopold Horst on the banks of the Rio Uruguay just north of Nueva Berlin, where it was growing in the mud flats, has provided new material for study (H 289). These plants have now flowered in my possession and they are clearly quite distinct from the other Uruguayan *Gymnocalyciums*. The individual plant bodies tend to grow larger than the average 'uruguayense' and to offset less freely. The spines are relatively few in number (ca.5) and quite short, white in colour with a characteristic red base. The flower tube is thinner and longer and the whole perianth is virtually white. Filaments and anthers were quite normal with no evidence of unisexual flowers. The plant is easily recognisable and distinct from the other 'uruguayenses' that it should stand as a species in its own right in the 'Denudata' section of the Macrosemineae.

Another plant that Gerhart did not mention was *G. melanocarpum* (Arech) Br. & R. from Paysandu - H 288 A - also collected by Buining and Horst near the Cerro Porton but in this case there seems little justification in the specific status afforded the plant and it should repose in synonymy within the 'form-circle' *G. uruguayense*, as it is very little different from the other yellow flowered forms.

The question of pseudohermaphroditism, I feel should not be overemphasised. It is certainly interesting and a remarkable character of some forms of the 'form-circle', but it is not constant. In some forms such as *G. artigas* it is predominant and progressively less so as one proceeds through *G. uruguayense* to *G. leeanum*. It is significant to note that *G. guerkeanum* and *G. hyptiacanthum* and *G. netrelianum* of horticultural origin as opposed to collected material do not show it, probably indicating the suspected hybrid origin of the commercially available plants of the latter.

The importance of flower colour in taxonomy is not capable of a straightforward answer. Its significance or insignificance depends wholly on its stability within a population; races within any population in which a colour predominates that differs from that of the type, can be distinguished by the category 'forma' - and even in some cases where other isolating factors exist by 'variety'. Varieties of a single individual within a population has no significance. Thus the fairly common occurrence of pink flowered individuals amongst the predominantly pale yellow G. uruguayense is of little significance, because the occurrence is sporadic - of random distribution within each population. One possible exception is the occurrence of a predominantly pink flowered population of G. uruguayense (H 93) discovered by Buining and Horst in the Cuchilla de Haedo.

Personally I would consider that G. denudatum is quite distinct from G. uruguayense although belonging to the same seed group. There are differences in flower structure, e.g. the longer tube, in rib structure - broad flattened non-tuberculate as opposed to rounded tuberculate, in rib count, average 5 rarely 6-8 in denudata but at least 6 and mostly 10 or more for uruguayense, predominantly pure white flowers; and only rarely do pink forms arise.

Gymno. denudatum v. pentacanthum nom. nud. is an exception here, in that the dominant flower colour is rose pink, but there are a number of other distinguishing features, e.g. the peculiar rough matt surface of the epidermis and its dull grey green colour, contrasting with the bright green smooth shiny epidermis of the type; the flower size, too, is exceptionally large being almost 80 mm across whereas the normal denudata is only 40 - 50 mm across. Several other new races of G. denudatum with sharper ribs and straighter spines e.g. the H 79 form from Quarita in Rio Grande do Sul is a good example that has also a distinct flower with fewer and more lanceolate perianth segments, quite unlike any G. uruguayense flower.

G. fleischerianum from Paraguay is also a species in its own right and quite separate from both G. denudatum and G. uruguayense; it is extremely variable within its own population but quite distinct in distribution. The flower is pure white with a deep rose-red throat not shown by any other Brazilian or Uruguayan Gymnocalycium. The seed though of the Denudata section is quite distinct from the other two species. G. paraguayense would also be wrong to be included in the same 'form-circle'. These multi-ribbed plants are as distinct from G. fleischerianum in Paraguay as is G. uruguayense from G. denudatum in Brazil and Uruguay.

G. megalothelos is a mystery plant that has not been rediscovered in the wild - it is self-fertile quite unlike all the others of the Denudata seed group. Basically it seems like an overgrown or overstimulated G. denudatum with all the characteristics that one might expect from a polyploid i.e. it may be a tetraploid if G. denudatum is diploid.

While it seems reasonable to combine all the yellow flowered Gymnocalyciums from the Rio Grande do Sul, Brazil and Uruguay into the single species G. uruguayense, on the basis of field data supplied by Rausch, van Vliet, Buining, Horst and Kraporickas and from the study of imported plants supplied by them, I do not find it reasonable to extend the reduction of species to include schroederianum, denudatum, denudatum v. pentacanthum, fleischerianum, and paraguayense.

I am indebted to the following for habitat collected material: Albert Buining, Leopold Horst, Gunther Moser, Anton Kraporickas, Dirk van Vliet, Karlheinz Uhlig and Werner Uebelmann.

Further, there is an excellent article on G. fleischerianum in the June 1970 Journal of the N.C. & S.S., by Gunther Moser.

..... and comments from G.J. Swales

The statement that seed structure is 'very uniform' for this group worries me somewhat especially as elsewhere in the article it is stated that 'with the exception of *G. uruguayense*, *G. artigas*, and *G. schroederianum* .... seed diagnoses .... do not exist'. In my experience (repeating again the warning that my seed samples may not be true to type) *G. artigas* can be separated from the remainder with no great difficulty.

The antics of *G. quehlianum* suddenly turning pink strikes me as somewhat remarkable, and I can only suppose that a drastic change in the chemical environment of the roots must have taken place. As this is something which is not likely to occur in the natural habitat then surely this is not relevant to the argument about the value of flower colour as a character in taxonomic studies. On the other hand, I do agree that its value is very limited although not for the specific reason quoted. I personally would also have played safe and omitted the words 'yellow flowered' from the title of my article!

I am not too happy about the 'purely botanical view' giving one species whilst from the 'practical point of view' two are possible, divided on the basis of geographic distribution. If a correct assessment of the facts has been made, then surely the two points of view should give the same result?

What little information I have on *G. hyptiacanthum* would support the idea that it probably belongs outside the group in question and had some affinity with the *Gibbosum* group.

I would add my support to John Donald's view that certain species should be excluded from the lumping suggested by Frank. For example, although I have no seed of *G. schroederianum*, I can with confidence differentiate between *G. fleischerianum* and the rest of the species by means of the seed, as I can also between *G. paraguayense* and the rest of the group; so with him, I would not like to see these two species amalgamated with the others, much as I wish to see a reduction in the number of so-called 'species' of *Gymnocalycium* we are at present blessed with.

#### NOTOCACTUS SUBGENUS MALACOCARPUS BUININGII F. BUXBAUM SP. NOVA by F. Buxbaum.

(Translated by R. Moreton from K.u.a.S. 19. 12: 68)

Among the new discoveries of Buining's Brazilian expedition of 1966 there is one from the border regions of Brazil and Uruguay southwest from Livramento-Rivera, which struck Buining as a rare *Notocactus* species, for it seemed to be a connecting link between the subgenera *Malacocarpus* and *Neonotocactus*. Buining subsequently sent to me a preserved flower, seed and a colour photograph with the request to analyse them. My examination showed, as the details below will establish, that Buining's assumption was correct. This fine species must therefore be described under its name as *Notocactus* (subgenus *Malacocarpus*) *buiningii* F. Buxb.

Diagnose: Solitarii, applanato-globosae, usque ad 8 cm altae et 11 cm diam., clare viridis, apice non lanuginosae, costis ca. 16, ca. 2 cm altis, tenuissimis, inter areolis acute gibbosis, gibberibus acute securiformibus, areolas ca. 6-7 mm superantibus. Areolis magnis ca. 12 mm distantibus primum albo-lanatis, deinde nudis. Aculeis 4 cruciformiter positus, acicularibus, interdum et nonnullis aculeis minutis: lateralibus usque ad 3 cm longis, lutescentibus, basi fuscis. Flores pro subgenere magni, aperti ca. 7 cm longi et ca. 8 cm. diam: pericarpello 6 mm longo 8 mm diam., squamulis minutis acutatis permultis instructo et ex earum axillis opulentissime albidolanato; receptaculo ca. 28 mm longo, campanulato, squamis anguste lanceolatis acutis usque caudatis instructo, squamarum axillis brunneo lanuginosissimus et setas ad 12 mm longas brunneas gerentibus; perianthii foliis ca. 35 mm longis, 8-10 mm latis lanceolatis, apiculatis, exterioribus brevioribus et brunneo-striatis, internis flavis; staminibus supra sulca nectarifera ca. 1 mm alta usque ad faucem aequaliter insertis permultis, primariis et secundariis non differentibus; antheris flavis; pistillo ca. 25 mm longo antheras aliquor superante, stigmatibus 9,

rubris. Seminibus campanulatis ca. 1.5 mm diam., opaco-nigris, hilo basali pulviniformiter prominenti, dilute fusco, testa verrucosa. Fructus (secundum Horst) usque ad 30 mm longo et 20 mm diam., fructu Notocacti mammulosi similis sed plus lanatus. Typus: Buining Nr. H.90 Typus material deponiert im Herbar der Universitat Utrecht, Holland.

Root system fibrous. Body depressed globular, always simple, never caespitose, up to 80 mm high, 120 mm across, conspicuously light grass green; not woolly in the apex; the ca. 16 ribs are very thin, about 20 mm high and 12-14 mm thick at the base and are sometimes disposed somewhat spirally; they are formed into pronounced thin, acute angled, hatchet like humps which project chin-like over the underlying areoles by 6-7 mm. The areoles are at first oblong, 3-7 mm long and bear white wool, but they soon become naked and are then roundish; they are placed about 12 mm apart, sunken deeply under the humps. The four main spines are arranged in cross formation, the upper and lower ones often accompanied by a few small adjacent spines; all spines are glassy yellow at the tip, becoming thickened at the base and dark brown, so that the four main spines arise from a dark background; the median main spines are up to 30 mm long and are adpressed closely to the humps; the horizontal spines are up to 20 mm long; the top of the plant is indeed covered with strong spines, even though the youngest areoles are still spineless, the yellow flower is ca. 70 mm long and fully opened is ca. 80 mm. across; the flower is thickly covered with woolly hair, whitish in the pericarpel area, brown in the region of the receptacle; the brown wool is interspersed with needle-like bristles. The pericarpel is ca. 8 mm across and somewhat greater in length; it is thickly clad with small pointed scales, from the axils of which the thick white wool arises. The receptacle ca. 28 mm long is campanulate; its equally numerous scales are very narrow lanceolate; from their axils arises the brown woolly hair covering and single, or at the most two, 12 mm long bristles. The inner perianth segments are pure yellow, up to 35 mm long and 8-10 mm wide, somewhat lanceolate and having a very small pointed tip; the outer ones are rather shorter, bright yellow with a brown mid line. The stamens arise above a nectar groove approximately 1 mm deep in a symmetrical, very thick array up to the throat; a division into two series is not possible. The thickly packed anthers, which completely fill the throat of the flower, are yellow. The 25 mm long pistil carries nine red stigma lobes. The fruit, which was not available to me for study, was described by Horst as resembling that of *N. mammulosus* although more abundantly hairy than that species: it is 20 mm across and 30 mm long, with bunches of hair, white below, becoming brown above.

The seed is campanulate with a large basal hilum which protrudes cushion-like and resembles thereby the seeds of the sub-genus *Neonotocactus*; the matt black testa is finely tuberculate.

Type locality: in the Brazil-Uruguay border region, southwest of Livramento-Rivera, on Uruguayan territory.

The placing of the species. The subgenera *Malacocarpus* and *Neonotocactus* are very closely related. Moreover, *Neonotocactus* is, by virtue of an extremely characteristic reduction feature of the flower construction - namely the total loss of the upper group of stamens and the way in which the basis of the innermost perianth segments run down to the inner wall of the receptacle - recognisable as an essentially more highly derived type.

A further mark of the higher stage of development of the subgenus *Neonotocactus* is the formation of the cushion-like projecting hilum, which the species of the subgenus *Malacocarpus* (with the exception of *N. vorwerkianus*), lack. *N. buiningii* is now a second species of the subgenus *Malacocarpus* in which the hilum cushion is developed. However, since in *N. buiningii* the interior structure of the flower - with the extremely numerous stamens, not separable into upper and lower series, but which are distributed symmetrically up to the throat - belongs absolutely to the subgenus *Malacocarpus* and in no circumstances to *Neonotocactus*, this species must, despite having the same seed structure as *N. vorwerkianus*, be placed in the subgenus *Malacocarpus*.

## Comments on *N. buiningii* from H. Middleditch

The comments made by Professor Buxbaum contain references to 'higher stage of development' and 'reduction feature' which tend to make heavy reading out of a very useful contribution to the classification of the *Malacocarpus*/*Notocactus* family. This terminology has been developed by Prof. Buxbaum to support his ideas that a change in tube hairiness or a change in stamen insertion between one or more species of a genus, is representative of a progressive change in features which has taken place over a period of time stretching back before ancient history. Prof Buxbaum's idea is that one end of the range represents the earliest form and that the difference between that and the next nearest species represents the development that took place over the course of many centuries; likewise subsequent development then produced the next now-apparent difference, and so on.

It should be noted, however, that other writers contend that there is not the slightest shred of evidence to indicate which end of the range necessarily represents the earliest form - nor is there any prime botanical evidence to support Prof. Buxbaum's idea that these differences are in any way related to a time-scale development. The theory appears to be the brain-child of Prof. Buxbaum and is without support from other quarters.

On the other hand, the comments upon the seed form and flower characteristics in relation to other species of *Malacocarpus* and *Notocactus* make very interesting reading. It would appear that Prof. Buxbaum is indicating that until now there has been a fairly clear dividing line between *Malacocarpus* and *Notocactus* by taking into account flower structure - particularly stamen insertion - and seed form. This newly described species of *N. buiningii* seems to have a *Malacocarpus* type of flower and a *Neonotocactus* type of seed. This situation clearly provides added support for the Buxbaum-Krainz proposal to transfer all *Malacocarpus* (*Wigginsia*) to the genus *Notocactus*. At the same time it brings complications in establishing a classification of the combined genus by blurring the lines of demarcation between subgenera.

In the next issue of *The Chileans* we hope to include an article dealing with the classification of *Notocacti* by flower characteristics.

.... and comments from J.D.Donald

The very detailed description of this plant cannot really be bettered. It is an example that should be followed by all those who wish to describe new species in popular Journals. If such description had been given for many species in the last half-century, how much easier life would be today in determining whether or not a particular plant is new - or an old taxon rediscovered?

As an exciting discovery I think that this plant ranks with other exotiques such as *Uebelmannia pectinifera*. It is a remarkably beautiful plant with its very pale green to blue green body and its glossy white to pale yellow spines, quite distinct from others of the subgenus. The spines are remarkably hard and stiff, much more siliceous than is general and frequently quite flattened in cross section, with sharp edges.

It is not difficult to grow but is rather slow upon its own roots - it grafts well and easily. Cultural requirements are typical for all *Notocactus* - a fairly rich acid soil sharply drained.

In the systematics the only thing which strikes me as odd, is the implication that *N. vorwerkianus* does not belong to the subgenus *Malacocarpus*. Surely there is no doubt at all but that *N. vorwerkianus* is a true *Wigginsia* or *Notocactus* subgenus *Malacocarpus* according to the category accepted.

.... and comments from K. Halstead

"I have a small grafted plant of *N. buiningii*, which is 30 mm in diameter and is truly an exciting discovery. It has several characteristics which are not normally seen in *Notocactus*, such as the very thin humps, semi-elliptical in shape, quite different from those in *Wigginsia* (*Malacocarpus*) and the intense concentration of greenish spines at the crown, which later become yellow glassy white and quite long. The white areoles have at first dark brown eyes, caused by the colour at the base of the central spines. Coupled with the light, almost lime green colour of the body, these characteristics give this plant a unique appearance. From the plastic features alone, I would not have put this plant in any of the *Notocactus* sections. Of course, I have not seen the flowers, fruit, or seed so cannot really comment on this relationship".

**NOTOCACTUS** (Subgenus *Malacocarpus*) **PULVINATUS** VAN VLIET SP.NOV. by D.J.van Vliet.

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

*N.pulvinatus*, proliferans, pulvinas ad 50 cm diam. formans: corpus globosum, ad 15 cm diam., viride, vertice albolanatum et spinosum; costae 14-24, acutae, vix crenatae, ad 15 mm altae et 20 mm latae, areolis orbicularibus, 4 mm diam., and 18 mm inter se remotis, vix in crenis submersis, griseo-tomentosis, mox glabrescentibus dein proles gerentibus; spinae aciculares, rectae vel subcurvatae, aureae vel pallide-brunneae, radiales 7-15, ad 2 cm longae, infimae robustiores, centralis 1, ad 2.5 cm longa, in statu novello adpressa dein radians; flores infundibuliformes, ad 4 cm longi et 4.5 cm diam., verticem circumdantes, tubo atque ovario lanum densam gerentes, phyllis perigonii lanceolatis, apice saepe erosis, citrinis; fructus oblongoideus, pericarpio tenue, pallide-roseo vel pallide - viride, lana alba vel pallide brunnea vestito; semina campaniformia, testa atroverrucosula, verruculis discoloribus, hilo albedo, plano vel subelato.

On my trip through Uruguay I found the *Notocactus pulvinatus* described here. I was quite surprised to see that this species was offsetting so well and making larger clumps than I have ever seen in any other species of the genus (subgenus) *Malacocarpus* (*Wigginsia*). As far as I know, a species with these characters was never described before. For this reason and since the habit of the plant differs from the other species of this group, I decided to describe this new species.

Body: offsetting and spreading to clumps of 500 mm in diameter; body globular or slightly elongated, up to 150 mm in diameter and up to 150 mm high, fresh green; apex covered with white woolly felt and spines. Ribs 14-24, acute, slightly notched to 15 mm high and to 20 mm broad; areoles round, 4 mm in diameter and up to 18 mm apart, slightly sunken into the ribs and with grey hairy felt, quickly becoming bare and then supporting numerous offsets.

Spines: needle-like, straight or weakly curved, with the many ribbed specimens strongly curved. The colour varies from plant to plant between golden yellow and light brown, becoming grey simultaneous with the areoles becoming bare. Radial spines 7-15, up to 20 mm long, the lowest 3-5 strongly more developed, the uppermost frequently weaker, or increased with one or two glassy spines. Central spines 10 to 25 mm long at first covering the apex, thereafter radiating outwards and later on downward pointing. With the specimen having many ribs, they are difficult to distinguish from the radials.

Flowers: funnel-form, up to 40 mm long and 45 mm diameter, arising from the dense wool on the apex and self fertile. Ovary and flower tube clothed in dense white and/or brown wool and small scales. Flower tube: purple-red below, the upper parts passing through red-orange and red to yellow; petals lanceolate, usually deeply frayed at the tip, both inner and outer surfaces glossy lemon yellow. The stamens inserted over the entire length of the tube, at the base of which there is a small nectary chamber, when touched causes the pistil to bend.





*Notocactus pulvinatus* v. Vliet.

Filaments: yellow with light yellow anthers; style light yellow, bearing 9 red stigma lobes which project beyond the stamens.

Fruit: oblong, thin walled, just showing from out of the wool, light pink to light green in colour, covered with whitish to light brown wool and with  $\pm$  50 seeds.

Seeds: bell shaped, the testa furnished with dull, unevenly coloured humps which appear as light or dark grey to black tinted spots on the testa, which is typical for the subgenus *Malacocarpus* (*Wigginsia*); hilum a dirty white, flat or somewhat wavy.

*Notocactus pulvinatus* was found by me in the surroundings of Melo, in the department of Cerro Largo, Uruguay, where they grow amongst lichen covered stones on the pastures. Here also occur *Notocactus* (*Malacocarpus* (*Wigginsia*)) *erinaceus*, *Notocactus ottonis*, *Frailea pygmaea* and *Cereus alacriportanus*.

*Notocactus pulvinatus* (*pulvinatus* = cushion forming) differs from the other species of the subgenus *Malacocarpus* (*Wigginsia*) in which Uruguay is very rich, by its clumping characteristic and spiny apex, and the way the fruit appears from out of the wool.

Holotype in the National Barbarium, Utrecht, Holland, under the number van Vliet 2 (field number: DV 25).

## URUGUAY

This country is on the eastern seaboard of the South American continent and is situated between the very much larger countries of Brazil to the north and Argentina to the west. Physically it is bounded on three sides by water – on the east by the Atlantic Ocean, to the south by the broad estuary of the Rio Plata, and to the west by the Rio Uruguay which is not spanned by a single bridge joining Uruguay to Argentina.

From the north, the southern tip of the Brazilian highlands juts down into Uruguay, although here it is much reduced in altitude. These highlands occupy most of the countryside, in the shape of gentle rolling hills with few abrupt slopes or outstanding peaks.

Although the seaward shores are almost entirely occupied by a low flat sandy coastal plain, some hilly spurs continue southwards from the highlands right to the shores of the Rio Plata at Maldonado and Montevideo.

The upland area is divided into two by the basin of the Rio Negro. To the north west of the Rio Negro is the Cuchilla de Haedo – or Sierra de Haedo – which is formed mainly of geologically recent sedimentary rocks, principally sandstones, interbanded with lava sills. This region constitutes the southernmost part of the very extensive Parana plateau; where the edge of the lava sills appear at the surface we find most of the steep *cuestas* and cliffs in the Uruguay. Resistant rocks metamorphised by the lava are also found scattered throughout this region, the highest parts of which are barely 1,000 ft in altitude.

To the south-east of the Rio Negro is the Cuchilla Grande – or Sierra Grande – which is formed mainly of ancient crystalline rocks, principally granite; the peaks of this range reach elevations of between 1,500 and 2,000 ft.

The whole of Uruguay has a fairly equitable climate and a rainfall fairly evenly distributed throughout the year. There is neither a marked dry season nor a marked wet season. Nor are there any parts of the country with either a marked deficit or a marked surfeit of rain – the rainfall varies from just under 40" per annum in the southern parts to about 50" per annum in the very north. Likewise the temperatures are not severe, being about 50–55°F in winter and 70–75°F in summer; mild night frosts do occur in winter.

Despite having a climate which would support the growth of trees, very little of Uruguay is forested. Indeed, only 2½% of its surface is covered with trees, less than any other South American country. It is difficult to account for the preponderance of natural grassland and the general absence of trees, which are present mainly alongside the watercourses and in the Paysandu–Mercedes–Paso de los Toros triangle. Possibly the incidence of rainfall largely in heavy downpours at irregular intervals, rather than in daily showers or at intervals of a day or two only, might contribute to the absence of a natural growth of trees on a larger scale.

The prevalence of natural grasslands has led to Uruguay becoming an outstanding sheep and cattle raising country, with agriculture confined to the southern lowlands and the sandy eastern coastal strip.

It is in those parts of the hilly territory where the soil cover is thin or in the vicinity of exposed rocks, where the great majority of cacti are to be found in Uruguay.

With a few exceptions, Uruguayan cacti are globular – even the widespread *Cereus peruvianus* only occurs sparsely in this country and there are specimens of the ubiquitous flat-jointed *Opuntia* to be found. The predominant cacti in Uruguay are *Gymnocalycium* – largely the yellow-flowered sorts, *Notocactus* and *Malacocarpus*, and *Frailea*. Some *Echinopsis* are found in the far west of the country.

The accounts given by Mhr Buining of his collecting trips in Uruguay which appeared in the Dutch Journal *Succulenta*, in the N.C. & S.S. Journal, and in the American Journal, may be followed on the map on this front cover. It will be seen from these accounts how widespread

are some species in this country. Mhr. Buining records that *Frailea pygmaea*, for example, was found in the north of the Cuchilla de Haedo near the Brazilian border, near Montevideo and also near Maldonado in the very south. Again, *Malacocarpus sellowii* was found in both the northerly and southerly parts of the Cuchilla de Haedo and at Piriapolis near the south coast. At the same time, many other species - some newly described, some old established - would appear to have a rather restricted distribution.

The occurrence of a more-or-less round the year rainfall might suggest that these plants could benefit from round the year watering in cultivation - always presuming the winter temperature in cultivation is now allowed to fall too far. H.M.

#### GRAFTING ON PERESKIOPSIS from E.W.Barnes

I would readily agree with the observations made by W.J.Ruysch and W.Sterk (Chileans No.15 pp. 20-21); pereskiopsis is an excellent stock for many seedlings. From the method of grafting described it appears that the seedlings grafted are at least a number of weeks old; very young seedlings will not 'take' if grafted too low down on pereskiopsis as the stock may be too lignified. If one wishes to graft very young seedlings (say 72 hours old) one has to tip graft and then no method of securing the scion is necessary or advisable. But by far the best stock for such tiny seedlings is hybrid epiphyllum - the thin triangular shoots are best, as these contain a great amount of sap and are most suited to such grafts.

I have tried the securing method described by the Dutch collectors but found it undesirable as it is rather a precarious means of weighting down the scion. A mere bump against the bench holding a number of grafts can ruin all ones efforts as the glass strips are easily dislodged. I find weak rubber bands are best as they exert an even and positive pressure all the time and shrinkage of the cut tissue does not cause the pressure applied to the graft to ease. The band can be pinned in place with a couple of spines or hooked around the areoles as little pressure is necessary. This can be removed after 24 hours to 48 hours depending upon the size of the grafted seedling.

Offsetting of the scion is a problem with *Neoporteria*, *Neochilenia* and *Islaya*; this can be very profuse, even seedlings a mere half an inch in diameter can have offsets at almost every areole right to the growing point. There seems to be nothing one can do to check this over exuberant offsetting, the best thing to do is to leave the offsets in place and let them grow, only removing a few here and there to allow the rest to grow naturally. If one removes too many, the offsets in turn will offset, but usually these remain single and can be grafted onto *Trichocereus spachianus* with the greatest of ease as they are extremely turgid and unite quickly with the stock and grow on almost without check.

I would also agree that weather conditions are important for grafting. All seedling grafts should be shaded for a few days at least - or until renewed growth of the scion is noted. If the weather is hot and dry it is advisable to stand the grafts on a tray of damp shingle in order to create a more humid micro climate around them. With seedling grafts it is important not to let the scion dry out or there will be a failure. Of course the stock should be kept well supplied with water before, during, and after the grafting. In this country it would be optimistic, to put it mildly, to expect to commence grafting seedlings in March. The grafting period here is from mid-May to mid August at the latest. Grafts made later than mid-August tend to dry off during winter, as they have been unable to lay down sufficient new conductive vessels to maintain sap flow from stock to scion and vice versa, before the onset of winter.

Seedlings overwintered on pereskiopsis have a tendency to grow during the darkest months and this can lead to 'drawing' of the growing points. If, however, a small amount of artificial light can be provided, normal growth can be maintained all the year round and quite spectacular results achieved in astonishingly short periods of time. Seedlings should be regrafted onto

Trichocereus well before the autumn. For instance, a seedling grafted on pereskiosis in mid-May should be ready for regrafting on to Trichocereus by mid-July at the latest if one has no facilities for maintaining higher temperatures during winter. Grafts left to overwinter on pereskiosis are rather soft and soon succumb to the cold. Pereskiosis will stand lower temperature if kept dry but is slow to commence growth in the spring in consequence.

I would also agree that Notocactus graft poorly, whilst on the other hand Neoporteria grafted very, very easily - perhaps the easiest of all. I find the best stock for Notocactus is Trichocereus pachanoi or Myrtillocactus geometrizans, but then the seedlings must be no less than about  $\frac{1}{4}$ " in size.

It is not necessary to regraft seedlings the first year, but if they are left on pereskiosis too long, they tend to grow down and around the stock and they are then difficult to remove because of this and the vascular cores will be found to be quite large and difficult to match up with those of a Trichocereus stock. If one removes the seedling by severing it near the base one will discover the vascular core at this point has become very lignified - even woody - and in order to clear this one has to make the cut across the widest part of the plant eventually, which then presents problems with the distance across the vascular bundles at the cut, if one wishes to regraft.

Pereskia can also be used as a stock, but it is difficult to graft onto and only the tip of the stem should be removed, this being the softest portion of the plant. If one attempts to graft lower down the stem it will be discovered that it is hard and woody - quite useless except for Zygocactus, etc. Grafts made on pereskia are usually very strongly spined and a tall bushy plant can carry dozens at a time, presenting a strange sight with them all growing merrily. It is important to ensure that the seedling graft is smaller in diameter than that of the stock. If the opposite is the case, then as the cellular tissue contracts, the tough, unyielding epidermis of the stock - which does not contract along with the internal tissues - will force the scion away from the site of grafting. If the seedling is smaller than the stock it is able to sink within the circumference of the epidermis and an uninterrupted union takes place. It is not possible to pare away this epidermis in pereskia as would be possible with normal grafts, as on cerei for instance.

..... and some comments from E.W.Bentley.

Early in 1969 I received Peter Thiele's catalogue listing seed collected in Chile by Knize. I ordered various species and also asked him to send me seed of all Copiapoa he had available. To my great surprise, just as I was about to set off on holiday at the beginning of June, a packet arrived with no less than 20 different lots of Copiapoa seed. This seed had only been collected in late April and early May and you can understand that I nearly didn't take my holiday. Anyway I got everything sown before the end of June and nearly every species seemed to have exhibited some germination within the week. I kept the hot-box at 80°F initially, although it got up to 105°F by mistake during the first two days!

By very early August these seedlings were doing quite well so I thought about speeding some of them up by grafting - so I grafted one each of C. imbricata and microcarpa on thin bits of pereskiosis, followed later by a few more. But I am afraid I was caught out as I then had to root up more pereskiosis cuttings before I could do any more grafting. This meant that any more grafting was out until mid-March, which was a pity as I believe that grafted seedlings overwinter better than on their own roots.

Even with only about half a dozen grafts I find that I under-estimated the overwintering vigour of pereskiosis. I find that where the seedlings were grafted on stocks that had lost their leaves then they have made very little progress. Those on pereskiosis stems which still carried a few leaves have done nicely - for instance a C. microcarpa has some beautiful new spines and is about 12 mm diameter and quite spherical. I shall now take care to graft on to pereskiosis with leaves!



I did graft a few more seedlings on to this stock at the very end of March and then had to wait for some of the small stock cuttings to grow on a bit.

#### MY CONTACT WITH COPIAPOA - 3 by Dr. E. Priessnitz.

(Translated by E.W. Bentley from March, 1964 GOK Newsletter).

Because of the many new discoveries in recent years Copiapoa has become the most species-rich Chilean genus, with its habitat lying in the extremely dry climate of the Garua zone. The extraordinary poverty of rainfall in its distribution area arises on the one hand from the shadowing effect of the Cordilleras from the damp east wind and on the other hand from the cold Humboldt Stream which forces the wind streaming in towards the continent from the Pacific, through intensive cooling, to give up its humidity in a considerable measure before reaching the coast. Only during the southern winter does the cool mist of the Garua fog-bank bring a slight precipitation (which in the coastal deserts appears only as a mist) to a more or less broad strip of land which stretches along the coast and often projects widely into the valleys of the Andes up to an altitude of 700-1000 m.

The Garua arises from the cold water masses brought up by the northerly-moving Humboldt Current, which starts in the Antarctic and in its further course comes up against the coasts of northern Chile and Peru. The moisture-laden wind blowing from the warm outer ocean towards the land gets so strongly cooled over the cold coastal stream that it condenses and fog builds up. Only in the winter months when the effect of the current through the strongly cooled upsurge is at its most intensive and when also the coastal belt is subject only to a moderate heating from the slanting rays of the winter sun can the damp air near the coast condense at lower altitudes. From June to August the Garua reaches its greatest intensity and although the sky month by month with its extremely high humidity looks heavy with rain the greatest poverty in measurable precipitation occurs. The yearly amount totals 10-50 mm but even this minimal rainfall may not occur.

The low moisturisation of the land surface, which at the most amounts to a fine spray of condensing mist, brings out on the landward facing slopes of the coastal ranges a light growth of short-living herbs which makes the land green in between the few xerophytic shrubs. Only in the higher levels of the mist-zone does precipitation in the form of rain occur, whereby the yearly average can reach 100-200 mm. With the warming of the land surface near the coast in the summer the Garua goes and although now through months of clear skies a glowing tropical sun burns down, the wind blowing daily from the sea maintains a high humidity, which in summer can reach a maximum of 90% saturation.

In our semi-arid east Austrian region or in the central Alpine 'Trockenlagen' which both belong to our regions of lowest rainfall, the rainfall for comparison reaches a yearly value of 500-600 mm.

The extreme Garua mist climate is an important factor in the ecological conditions of the homeland habitat of the genus Copiapoa. This perhaps permits us to derive a basic key to the culture of this genus. Here also we find an explanation of why Copiapoas in our glass-houses are so sensitive to insolation during the vegetative phase. Moreover small species frequently grow sunken in the soil up to the crown, as for example Copiapoa hypogaea, the name of which means 'below ground'. This protection against evaporation and light is also made use of by many other dwarf species, which by shrinking during the dry resting period pull back into the soil. Its underground water reservoir, in the form of a tap root, exceeds its dwarf plant body often many times in size. Typical examples from other Chilean genera are Neoporteria (Neochilenia) napina and many species of the genus restored by Ritter, Chileorebutia.

Unfortunately many habitats of the newer species are not known to cactus enthusiasts, because these are not quoted by collectors. Because of competition they are kept secret.

As an interim solution to the avoidance of synonymy, new discoveries prior to valid description, or unknown species until their determination, are provided by the collector with field numbers. This unfortunately often leads to the situation where plants stay in collections with these for a number of years and their identification is often only thanks to an accidental visitor to the collection. The cactus lover unfortunately cannot escape the impression that collectors' numbers merely serve to present long known species in new clothes. Until he can establish this identification he has often bought a pig in a poke, for how many cactus lovers can choose the plants themselves at the importer's. However, at times, a species can be falsely named without knowledge of the flowers which makes things interesting for the cactus grower as, for example, when for a year or so many new *Pyrrhocactus* were imported as *Acanthocalyciums*.

I would recommend you however to sow your own seed of *Copiapoa*. It is astonishing what surprises you get by this. Young plants from seed harvested from different sources show within the same species often a very heterogeneous appearance. It is even more the case that sowing in different years produces a different picture. Some *Copiapoas* differ most widely from one another as young plants until with increasing age the differences in habit dwindle more and more. Particularly in the very polymorphic Chilean species interesting observations can be made. Besides noting the whole range of variation, natural hybrids appear with varying frequency. Also many 'false' seeds smuggle themselves in during collection of wild seed, in dividing them up etc. - often to your surprise. Naturally it is not easy to decide whether the offspring of two species are to be regarded as hybrids, or whether the two species and their transitional forms represent a single species rich in forms. Look at *Copiapoa cinerea* - *haseltoniana*, which Hutchinson allocated both to one species, while Ritter who is an author in no way known for his generosity in setting up species, besides these two species has found many others and seems to have gone too far. I have observed in seed-sowings that these newest species (*Copiapoa columna alba*, *dealbata*, *calderama*, *eremophila*, *alticostata* etc.) perhaps exhibit a certain, however not inappreciable, range of variation, but in general show a demarcatable compactness. Whether this justifies a row of species or only variations or forms is beyond my observation. For this perhaps a thorough knowledge of the habitat from this standpoint would be necessary. Combinations such as Backeberg has set up when he regards Ritter's *Copiapoa columna alba* as *Copiapoa cinerea* var. *flavispina* rather supports Hutchinson's interpretation, for the reason that though *Cop. columna alba* in culture, when it lacks the grey-white covering, shows a strong resemblance to *Cop. haseltoniana*, in any case, from observations of its young form it seems to stand nearer to *Cop. cinerea*.

*Cop. cinerea* var. *albispina* with grey to white spines I have as specimens with grey-green but also brown plant bodies. However it seems we have transition forms to deal with here.

Often it seems that the description of a new species has no other useful purpose but to add to the number of species already described by the particular author. *Copiapoas* perhaps offer the possibility of new description only to the collector in habitat or the possessor of short-lived exports. The difficulty of culture and the resulting impossibility of an associated longer observation scarcely affords a possibility of a further sub-division of the species as this, from the example of *Gymnocalycium*, straightway leads into the ash can. Here the arrival of the xth culture-generation initiates a new species or variety. It would naturally be completely hopeless to find this species at any time again in nature. But there are many specialists who devote themselves with great enthusiasm to this task.

## THE GENUS PARODIA - 2 by W. De Cocker

(Translated by H. Middleditch from Dodonaeus 6, 4: 1968)

Another importer, Uebelmann, put on sale plants collected by Horst and carefully listed under various HU numbers, which I also possess:-

- HU 40 - bueneckeri form
- HU 41 - " "
- HU 43 - brevihamata form
- HU 44 - bueneckeri form
- HU 45 - " " (uebelmannia n.n. with long yellowish spines)
- HU 46 - brevihamata (type)
- HU 47 - " "
- HU 53 - " " form with long black spines
- HU 68 - bueneckeri form
- HU 69 - form intermediate between bueneckeri and brevihamata
- HU 71, HU 72, HU 74. All as HU 69

All these plants differ more or less from one another, carry long or short spines of which the shades vary from white to black via yellow and brown. And to increase the series, I possess, as well as the typical form of Haage, examples with very long spines (which is in express contradiction to the diagnosis of the species!) and another form with white spines for which I am indebted to Mr. Blanc of Lausanne.

I have grafted all these plants and I cultivate them scrupulously under the same conditions and, up to the present, I must comment that they are evolving towards a common type and looking more and more like each other. I presume therefore that they are all forms of one and the same very variable type in the occurrence of *P. alacriportana* which one should rename: *Notocactus alacriportana*.

It should also be pointed out that Prof. Buxbaum has similarly declared that *P. bueneckeri* was a *Notocactus*, but he made no mention of the two others: *brevihamata* and *alacriportana* which Mr. Krainz has, shortly afterwards, likewise removed to their logical place amongst the *Notocactus*.

Prof. Buxbaum has quite recently published a very profound study of the genus *Parodia* wherein it is also mainly a matter of seeds, but on the very account of its authority, this work takes on a highly scientific character which cannot fail to frighten off the majority of amateurs.

Cardenas and Ritter have, in the course of recent years, described a goodly number of new *Parodias* which they have collected themselves. It is particularly Cardenas to whom we are indebted for the beautiful *P. comarapana* (I suspect that this is a misprint for *ayopayana* - H.M): its seeds resemble well enough those of *P. maasii* but are completely covered by the arillus layer which gives them an unusual matt brown appearance. They are entirely without a strophiole and I have personally never seen another which resembles it unless it is certain *Notocactus* and *Malacocarpus*.



One other plant also discovered by Cardenas and which enjoys the interest of collectors is *P.comarapana*: elongated and slightly bent, furnished with a very small strophiole, shiny black and studded with nodules forming ribs which gives the seed a striated appearance.

Ritter has introduced on to the market an extensive series of new names, of which many have not yet been described. The majority of these plants are related to the group of *Parodia maasii* and, quite remarkably, their seeds are of the same type as those of *P.maasii* (*camarguensis*, *camblayana*, *castanea*, *commutans*, *maxima*, *rubida*, *suprema*, *subterranea*, *culpinensis*, etc). One would therefore logically be correct to ask whether all these plants can be considered as species and whether they are not rather forms or at the most varieties of *P. maasii*. It is, at all events, the opinion of Mr.Krainz, as they are all recombined with *P.maasii* in the 1967 catalogue of the Municipal Succulent Collection at Zurich.

On the other hand, it is not the same thing for *P. fulvispina*, of which the seeds are globular, with a shiny black testa where the rounded humps are only just marked and not at all prominent; the plant is furnished with magnificent spines very similar to those of *P.maasii* but, on the other hand, it takes on a columnar appearance.

Up to his last breath, Backeberg did not cease to publish descriptions of plants collected by Fescher, Rausch, Krahn, and Mme Muhr, all commercialised by the firm of Uhlig. They were mainly plants of the group *microspermae* which, in my humble opinion, are nothing but local forms or at the most varieties, of known species. One can say that it was somewhat presumptuous to name these as 'species' without previously having minutely studied them and without possessing more information on the subject of their natural locations. One such thoughtlessness can only add to the confusion which everyone deplores and extend the list - already too long - of synonyms.

(There follows comments upon the seed of *Uebelmannia*).

One could undoubtedly say a great deal more on the subject of this very interesting genus and in particular to resolve other enigmas, as for example:

- *P. peruvianus* of which no one knows the origin but of which everyone is quite sure it is not Peru.
- *P.brasiliensis* and *P.paraguayensis* described by Spegazzini which no one owned and which has never been rediscovered in the places referred to in the diagnosis. It would seem also that there are not any cacti in these districts and, on the subject of *P. paraguayensis*, it must also be noted that the examples which are to be found in some collections do not correspond with the plant description.

In the way of conclusion, I propose to reconsider the systematics of the genus *Parodia* which could be classed in different groups based upon the structure of the seed:

#### 1.1 Group microspermae.

Small seeds - less than 0.5 mm, excluding the strophiole - and spherical in form, testa smooth and shiny, reticulated, strophiole yellow or brown, of regular shape, as large or larger than the seed. One can place here the following typical species: *P.microsperma*, *erythrantha*, *sanguiniflora*, *aurispina*, *mutabilis*, *sanagasta*, *setifera*, etc.

#### 1.2 Group chrysacantha.

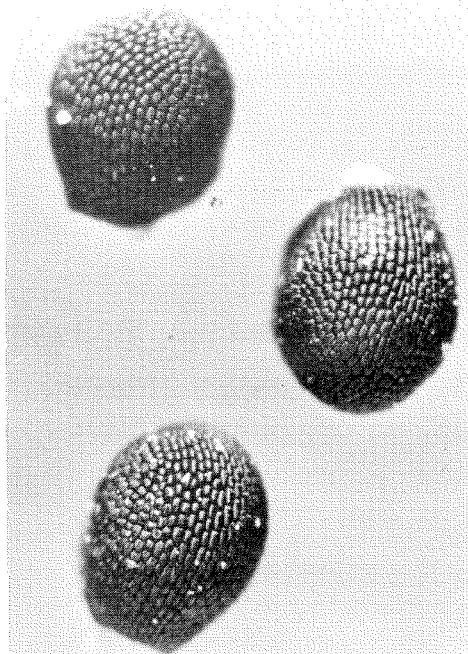
Small seeds - less than 0.5 mm excluding the strophiole - oviform, testa red or black, smooth, furnished with round or elongated tubercles, strophiole irregular, smaller than the seed, conical or in the form of a pebble. One can place here the following typical species: *P.chrysacanthion*, *nivosa*, *faustiana*, *stuemeri*, *saint-pieana*, *ocampo*, etc.

#### 2.1 Group fulvispina.

Large seeds, 1 mm dia., spherical, testa smooth to tubercled pattern, black, shiny, strophiole very small, nearly nonexistent. Single species, *P. fulvispina*.



PARODIA  
SCHWEBSIANA



PARODIA  
MAASSII



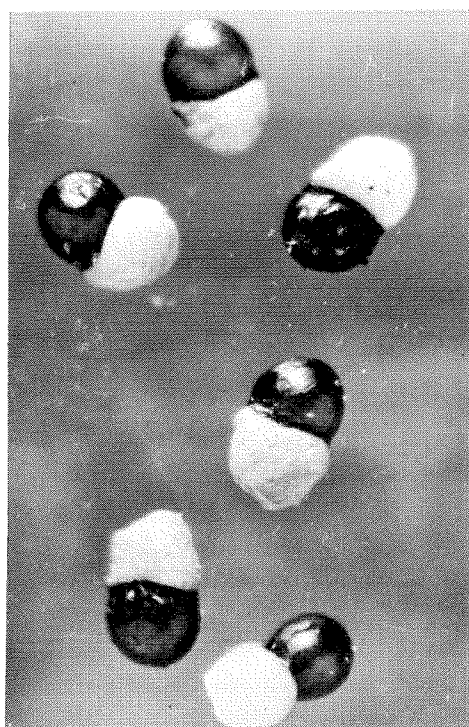
PARODIA  
COMARAPANA



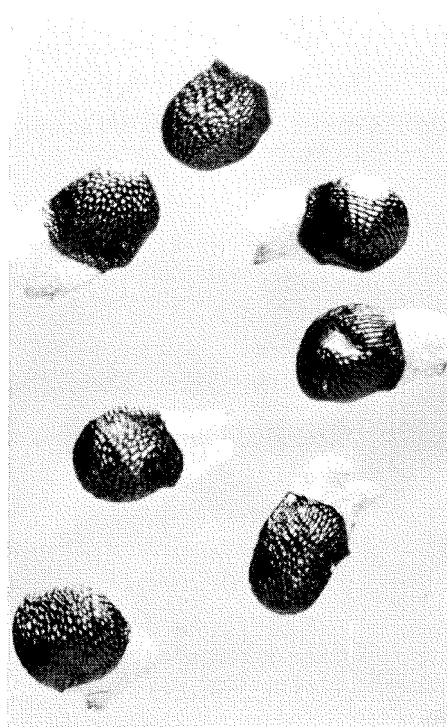
NOTOCACTUS  
ALACRIPORTANUS

PARODIA SEED      Photograph - W. de Cocker

Dodonæus      6. 2. 1968



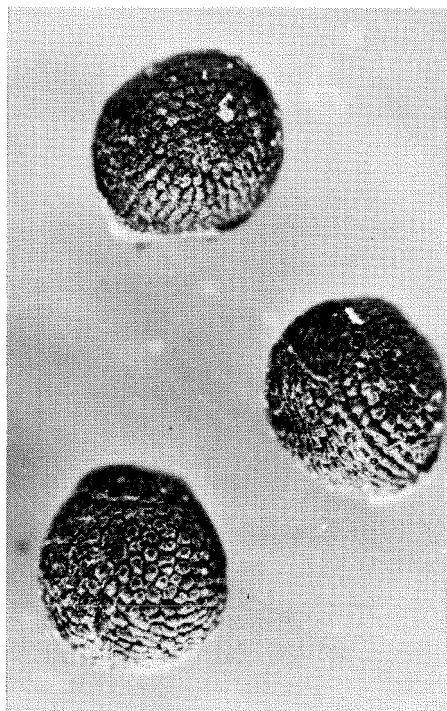
PARODIA  
SETIFERA



PARODIA  
CHRYSACANTHION



PARODIA  
FULVISPINA



PARODIA  
AYOPAYANA

PARODIA SEED Photograph – W. de Cocker

Dodonaeus 6.4.1968.

## 2.2 Group ayopayana.

Large seeds. 1 mm dia., spherical to oviform, testa matt, arillus dark brown on the round and globular humps, strophiole very small. One single species, *P. ayopayana*. Group Oblongisperma - Buxb. (Author's error; should read Obtextosperma Buxb. - H.M.).

## 2.3 Group maasii.

Large seeds, 1 mm dia., oviform, testa furnished with oval tubercles, black to dark red, dull, strophiole very small. The species most well known are: *P. maasii* and its numerous forms, *P. mairanana*, etc. Group Macranthae Buxb.

## 2.4 Group schwebsiana.

Large seeds, 1 mm dia., elongated, not bent, furnished with round or oval nodules, black, shiny, strophiole small. Species: *P. schwebsiana*, *tuberculata*, *otuyensis*, *multicostata*, etc. Group Oblongispermae Buxb.

## 2.5 Group comarapana.

Large seeds, 1 mm dia., elongated, testa shiny, dark red, furnished with elongated nodules which form almost uninterrupted ribs of crenellated appearance. Species: *P. comarapana*, *comosa*, etc.

(There follows notes on seeds of *Brasili-Parodia* and *Uebelmannia*).

## Conclusion

In starting this research, I had no other objective than to investigate the methods or the contrivances which allow of the best determination of our plants for classifying them in groups according to the structure of their seeds.

It was, in effect, logical to exploit the wide diversity of cactus seeds to assist in the systematics of the botanical family. The first tentative attempt to do this was in 1925 when Fric and Kreutzinger published "Revision des Systematik des Kakteen". The system which they proposed turned upside down so many of the established ideas that it is not surprising that it created sharp reactions and passionate controversy. As a result of their neglecting or refusing to publish this study in Latin, conforming to the regulations of the international code for botanic nomenclature (this requirement did not apply till 1935 - H.M.) one can have no difficulty in rejecting their conclusions although there is nothing fundamental to take exception to in their works.

At present it is above all Prof. Buxbaum who gives great attention to them and who regularly publishes on this subject in the periodical "Die Kakteen".

If the study of seeds allows one to classify a genus into groups one cannot meanwhile, in the present state of our knowledge, affirm that it alone suffices to classify species and permit the establishment of keys for identification. It is as well not to neglect other important factors such as the flower, the fruit, and the habitat and to the extent that any of these criteria do not result in the production of fundamental difficulties, it is most worthwhile to leave the apparently grouped plants together in one species.

Considering that the descriptions of new species have not often taken sufficient account of the variations between various examples from the effect of the conditions of their respective habitats, it appears that a goodly number of plant types are only natural hybrids or local forms which have not any right to figure as 'species' in botanical nomenclature.

I would now however like to finish without pointing out quite plainly that this modest study is far from being complete and that there could well be other things to follow up, for completing it and eventually to bring in modifications in the light of additional information gathered in proportion to new imports and the examination of a greater number of examples.

It is, in effect , probable that we will continue to receive, in the years ahead, a quantity of new plants of such a kind that the subject is far from being exhausted.

#### Comments on Genus *Parodia* - 2 from D.J. Lewis

In comparing the article written by de Cocker and his photographs of *Parodia* seed, with my own observations, I find myself largely in agreement with his observations and conclusions.

It is really amongst those seeds which are more or less in transition between *microspermae* and *protoparodia* where my interpretation differs from that of de Cocker. I would, for example, leave *P. nivosa* in *microspermae* because of its strophiole type and retain a group of 'microspermae variants' with the angular and squared off strophioles of *penicillata* and *St. Piena*. On the other hand, *faustiana* has the typical thin keel like strophiole of *protoparodia*.

The seed which I received as *chrysacanthion* is as sketched (Chileans No.16 p. 33) quite different from that illustrated by de Cocker. Has he by chance acquired seed of *P. chrysacanthion* var. *laucocephala*? Buxbaum's sketch of this seed differs slightly yet again and he places it in *Brachyspermae*, as I do.

When it comes to the *maasii* group of plants, the seeds I received as *maxima* seemed to me to be akin to *Brachyspermae* whilst even *commutans* was not quite what I take to be *Macranthae* - it did not have much strophiole at all.

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We should be pleased to hear from any members who have been able to take slides of any cacti seeds - A.W.C.

#### TREATMENT OF IMPORTED PLANTS

With the increasing number of imported plants now being made available to collectors from dealers in Britain, other subscribers might echo the query from C. Walker to the Chileans - 'could anything be written on the treatment of imported cacti - rerooting them and watering them whilst this process is taking place?'

A comment upon this aspect will be found following the notes on *Copiapoa conglomerata*. Successful in rooting an imported *Coleocephalocereus brevicylindricus*, D. Angus describes how "I had been moving some plants around and decided to place this plant on the edge of my water tank in the greenhouse. In the course of watering some other plants I inadvertently caught the *Coleocephalocereus* and knocked it into the water tank. Feeling that this would result in its prompt demise, I just left it in its watery grave and departed. A couple of days later, when more resigned to its loss, I fished it out of the tank and stuck it somewhere to one side for the time being before throwing it away. Not long afterwards I discovered that it was looking much improved and was actually putting out roots, so I potted it up and it settled down quite well".

Perhaps somewhat more systematic with the dunking technique, E.W. Barnes observes 'I do actually soak most of my imports for a number of hours or even for up to 24 hours if they are very dehydrated. I dry them off on the heating pipes or in the sun, but it appears that quick drying is not really necessary. I cut back only those roots that appear unsound; any that show white or creamy when the loose outer layers of epidermis are removed, I leave alone, or any that are soft or resilient when squeezed gently between finger and thumb. Dead roots are hard and break easily when gently twisted - it is just a matter of experience, you can soon tell which are the viable roots once you have had a few imports".

A problem plant was encountered by C. Williams who "tried to establish a *Discocactus tricornis* for two years, first with its own roots, then with the roots cut off, then cutting off a small part of the base and scraping away some more of the adjacent tough old epidermis. I have

tried spraying with hot water, completely immersing it in hot water, or giving it bottom heat and no spraying all without avail, for it still has not rooted".

Some recently imported *Gymnocalycium* and *Weingartia* were treated by G.J. Swales to "a soak of up to one hour in warm water and then dried off on the fish tank. Only if there is any obvious rot or damage do I cut roots off and if this cuts back to living tissue, I apply to the cut surface a rooting hormone which contains a fungicide. If any mould appears I wash it off with a chinosol solution and just let it dry straight away on the fish tank. The plants are left in empty pots standing over the fish tank (which is set at just over 70°F) with each pot in a shallow dish into which I dribble water from time to time.

"Two plants have got well away with new roots and these have been potted up, in Levington's compost, but the compost is only half way up the part of the plant normally underground; these are being sprayed regularly.

"Fungus diseases are probably a major hazard in establishing imported plants and fungus spores are very difficult to get rid of. While looking for seed in between the thick crop of spines on one *Weingartia*, I found one or two dead flowers and these sported a beautiful crop of fungus".

Receiving some plants from Sargent in February, W. Withers "first examined the roots on each plant, trimming off any dead ones and cutting right back any that were broken or damaged. The plant was then laid upside down on the staging for a week more or less, to dry off the cut surfaces, after which it was placed on a pot full of rooting compost. The pot was placed in a tray and a little water kept in the tray - the plants were not watered or sprayed. The tray was stood on the slatted staging immediately above my paraffin heater. The rooting compost was a mixture of vermiculite and sand, containing rather more vermiculite than sand. A fair crop of roots was produced on each plant by the end of March".

Also tackling some imported plants, H. Middleditch comments "At the end of March I obtained a number of imported plants from Hallett - although not without some trepidation, in view of my very limited experience with imported plants and proven ability (with most of those I had tried so far) to reduce an interesting looking specimen to become, ere long, a prime candidate for Dr. Priessnitz's ash-can, this being a somewhat expensive way of running a cactus collection. It was observed when a selection was made at the importer's premises, that most of the plants which were already showing roots were those which had had their roots shaded from direct sunlight - very few being actually in compost at that time. Having brought our acquisitions home, the drainage hole was considerably enlarged in a few pots, which were inverted on a tray and the plants placed on the pots with their lowermost parts projecting down inside the pot, surrounded by air. The object of this was to exclude direct light and additionally, by placing water in the tray, to generate a localised moist atmosphere around the portion which should produce new roots.

In addition, bearing in mind previous comments from various sources regarding the effectiveness of spraying and the desirability of avoiding spraying with cold water, the plants were sprayed with water which was nearly too hot to the hand when in the can, but was considerably cooler when broken into a mist spray.

Most specimens began to show signs of new root growth in a remarkably short time, but in addition little spots of blue-green fungus began to appear in the vicinity of these new roots. Having been regaled many times with tales from old hands at this game about imported plants where roots had been cut - only to find rot had spread up the vascular bundles, so that cuts had to be made further and further up the stem in an attempt to remove the diseased portion, to finish up with only the tip of the topmost spine as the residual portion - I suspected that fungus growth on or near new roots could well lead to a similar result. In consequence I have now acquired yet one more concoction for the greenhouse, a tin of rooting hormone complete with fungicide, this latter property being the cause of my interest. Unfortunately, having put this tin down in the greenhouse, I have lost the three square inches where the plants were going to stand.

One reason for trying to produce roots in air rather than on sand or compost, was to avoid the situation of having to lift the plant off or out of the rooting medium to examine for the presence of, or the condition of, new roots. Should a root have grown well since the previous inspection there is always the possibility that it may be secure in the rooting compost and be damaged in lifting up the plant".

Any further comments from members on rooting imports would be welcome.

SULCOREBUTIA. From the Chileans Robin.

Following the comments in the previous round on setting fruit on *Sulcorebutia*, H. Middle-ditch comments that "I would be interested to hear more about the size, shape, colour and so on of these fruits, never having seen any yet. I wonder, for example, whether the seeds are quite loose in the pod when the fruit is ripe or whether they are embedded in a stiff pulp?".

Mrs. J. Mullard observes that "I did endeavour to set seed last year, by pollinating *Sulcorebutias* with themselves, but even then nothing came of it at all, no sign of a seed pot of any sort. I was quite surprised at this, as other plants will set seed when crossed with the 'same family' or two plants of the same species".

Bob Hollingsbee makes the following notes on the seed pods he has had upon his plants:-

*S. steinbachii*. Split vertically; seeds embedded in dry remains of pulp - free by rough handling or rubbing on palm of hand. Pods light brown, about 5.5 mm diameter. Two pods contained 53 seeds in all. Two pods on a second plant of *steinbachii* contained only four seeds each.

*S. lepida*. Pod rather darker, also about 5 mm diameter, still not dried up, containing seven seeds, embedded in dried pulp.

*S. polymorpha*. Pod dries to a hard lump about 4 mm diameter. One pod contained three seeds.

*S. kruegeri*. Pod 5 mm diameter, medium to light brown; four seed pods on one plant yielded a total of 94 seeds. A pod off another plant contained eight seeds. No pods were split or dried up; there was a slight amount of dried pulp inside.

*S. taratensis*. The dried pod is very light brown and up to 5 mm in diameter. This was not brittle but still slightly soft so evidently the pods were not completely dry. They were not split. The four largest pods were examined and contained only three seeds between them.

*S. arenacea*. This plant flowered later than most other *Sulcos* this year. The pod was not split and had not dried up inside. There was little or no pulp present. Pod did not contain any viable seed.

I was beginning to think that 5 - 10 seeds per pod was probably average for *Sulcos* until I counted out the seeds in the pods of *steinbachii* and *kruegeri*.

These notes were made when harvesting the seed at the beginning of September and Bob Hollingsbee adds "the seeds are not loose as is the case with *Rebutias*, for instance. The fruits are more akin to *Lobivias* and *Mediolobivias*, with the seeds embedded in pulp".

E. W. Barnes also refers to having found but five to ten seeds per pod in some *Sulcorebutia* fruits set on his plants.

John Donald comments that the discussion on fruits and seeds interests him because "it is partly from studies of the seed and fruit that the realisation that *Sulcorebutia* was not a close relative of *Rebutia* came about. The fruits and seeds are basically *Lobivia* type), as the observations made by Bob Hollingsbee confirm - dehiscion, pulp with seeds, seeds still attached to the cords, thick fruit walls, etc. It is interesting to note that most seeds were produced in those species where clearly no vegetative relationship exists between the individual plants used as



parents i.e. where it is likely that sufficient different individual plants have been imported to make it statistically possible that in any one collection, two plants bearing the same name are of different stock".

Mrs. J. Mullard asks whether imported plants with "rather ugly corky bases, should be planted in the pots to cover this corkiness or should it remain above ground? *S. steinbachii* v. *gracilior* was acquired as an import in 1965 with three heads and a rather unsightly corky strip but now it is completely covered by five new heads."

H. Middleditch and R. Hollingsbee both raise questions on the grouping of *Sulco* species and K. Wahle comments that the six plants of *S. lepida* which are ex-Ritter, in his collection, are quite variable and seem to range towards *tiraquensis*, like a plant received from Cardenas. On this subject John Donald comments: "It was my privilege this year to meet Walter Rausch, the 'Viennese collector extraordinary' to discuss many problems concerning *Rebutias* and *Sulcorebutias* from Bolivia. Walter has now visited Bolivia four times and thoroughly covered all the *Sulco-rebutia* territory. He has found many new species which will be described over the next year or two and at the same time he will be distributing bits and pieces to various individuals across Europe to ensure that they do not become lost to cultivation.

"It is strange that Walter and I agree that there are already many superfluous species in *Sulcorebutia* and then should state that there are many new species yet to be described. Yet this is a very true predicament and happens quite frequently when there is an intensive study of a particular group of plants - many existing species get reduced to synonymy as the distribution of the whole gets better known but this same search on the ground discloses plants overlooked before and necessitates the creation of new species. It is happening in Brazil with *Notocactus* and in Peru with *Matucana*.

"The older species will get better and broader descriptions to cover the enormous natural variation that exists and which encompasses many existing so-called species of a slightly later date. In all probability what we have considered as groups of species of similar morphology and distribution may well be reduced to a single species in the next stage of development in the understanding of *Sulcorebutia*. At first it is not easy to accept that - say - that *S. lepida* and *S. tiraquensis* are the same species called *S. steinbachii* but when one has seen the enormous variation that each of these three individual species can show, it is not difficult as they all merge gradually with each other. Only the extreme forms stand out alone when separated from their intermediaries; these extreme forms have been artificially selected right from the start and familiarity with these extreme forms imprints upon our minds an artificial picture of what constitutes the species. It is only on the ground in their natural habitat that the true picture emerges.

"All too often the glasshouse bound collector cannot recognise a new import as a representative of a familiar species because of this imprinting. Part of the trouble is due to the fact that very few individuals of some plants are imported in the first instance. Modern methods of propagation can produce thousands of similar individuals all from one single original all in a very short time. Not only does this produce a standardised plant of uniform appearance but it effectively reduces the statistical significance of any observations made on such plants and hence the value of the deductions based on these observations. Plants raised from seed would score significantly better in this sense but it is extremely difficult to get true seed. The failure to produce viable seed or at best very little viable seed is probably explained by the fact that very many of the plants of most species of *Sulcorebutia* in cultivation have been derived from a single clone of each species. In fact copious seed production can only be had in these cases by deliberate cross-pollination of two allied species, leading to hybrid plants.

"The majority of *S. arenacea* seedlings bought as grafted seedlings are the result of a *S. arenacea* x *S. kruegeri* cross; admittedly the *kruegeri* parent was carefully chosen to be as close as possible in appearance to a typical *arenacea*, but the offspring bear an unmistakable mark of *kruegeri* - the slightly raised tubercle which is completely absent in *arenacea*, also the spines of the hybrid (particularly when grafted) become brown rather than the white or pale yellow of the true *arenacea*.

"Another hybrid is *S. totorensis*; most of these appear to have been derived from a *S. totorensis* x *S. lepida* cross. The true *S. totorensis* has very long, absolutely straight red brown to black spines with a very large pure crimson flower - the hybrids have weaker spines from pale brown to red-brown and a smaller flower only slightly larger than that of *lepida* and varying in colour from deep scarlet to crimson.

"*S. candiae* has also probably been crossed with *S. kruegeri* or perhaps the *S. candiae* offered is a hybrid between *S. menesesii* & *S. kruegeri* (occurring naturally in the wild as well?) *S. candiae* is, as far as I can see, only a brownish shorter spined version of *menesesii* - even the only true import from Cardenas in the collection of Albert Buining.

"I think that the following plants are generally correctly identified and can be genuine original material:- *steinbachii* and var. *gracilior*, *tiraquensis* and v. *electracantha*, *glomeriseta*, *kruegeri*, *canigueralii*, *tunariensis*, *polymorpha*, *brachyantha*, *lepida/mentosa*, *weingartiana* on own roots.

"The following may be genuine but are probably all derived from a single clone of each species:- *totorensis*, *taratensis* and var. *minima*, *tarabucoensis*, *sucrensis*, *arenacea*, *caineana*, *menesesii*, *glomerispina*, *verticillacantha* and var. *verticosior*, *weingartioides*, *zavaletae*.

"I would support Bob Hollingsbee's suggestion that most of the so-called *S. hoffmanniana* are in fact *Lobivia schieleana*.

"I am also interested in Bob Hollingsbee's *S. canigueralii* with the purple flower instead of the normal tricoloured flower of this species. I think that this could in fact be a plant of *S. zavalatae*".

Some further observations on *Sulcorebutia* from V. J. Corbett.

"I have been able to accomplish seed setting on some *Sulcorebutias* with the aid of a pollinating brush. My wife is also keen on *Sulcorebutias* and duplicates up on most of the species I have, so we have two of most of them - 'his' and 'hers'. In 1968 I had seed from the species *tiraquensis*, *mentosa* and *tunariensis*. Seeds have been produced in 1969 on species *glomeriseta*, *mentosa*, *tunariensis*, *taratensis* and *tiraquensis*. The fruit is a dry seed-pod, which when ripe splits across from the base, the upper part holding the seeds exposed for falling directly on to the soil. This latter they seem reluctant to do, but hold together in a dry mass. I have counted an average of 40 seeds per pod. Each seed has a matt surface which is accounted for by what appears to be minute brown warts superimposed upon a black testa, with a shape somewhat akin to *Notocacti* seed.

The germination from the 1968 seed was extremely poor and all the resultant seedlings have now perished - the last vanished around Christmas. Some seedlings expired practically as soon as germinated, while others faded away from time to time. There was no fungus, certainly not too damp, but possibly erring on the dry side. It is possible that the climatic and artificial growing conditions for the plants did not produce a sufficient amount of stamina in the seeds, although on the face of it they did look perfect. I have had fair germination of *Sulcorebutia* seed obtained from de Herdt, which has no doubt been obtained from habitat.

.....and comments from H. Middleditch

In the course of conversation on the subject of seed setting on *Sulcorebutia*, it has been suggested that until very recently the actual number of plants of *Sulcorebutia* imported into Europe were very limited. It would seem that almost all the grafted plants of *Sulcorebutia* obtainable in the last few years from Continental suppliers like de Herdt were produced by vegetative propagation. Indeed it does seem quite probable that a great many of these small grafted plants might well have come from only one or two clones. Cross pollination between plants originating from the same clone will commonly exhibit a greatly reduced number of seeds in a fruit, poor germination, and the resultant seedlings will be frail with a poor chance of survival. This could go some way to accounting for the disappointing results reported above by V.J. Corbett, but one would have

expected that seed from fruits containing something like 50 seeds might germinate and grow better, since it is likely that to produce such fruits, cross pollination probably took place between plants of different clones.

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Sulcorebutia - Rausch collected plants.

On our 1964 Cactus Tour to Austria we visited the nursery of Ing. Maly in Vienna. A number of the Rausch collected plants have reached the trade by way of this nursery and a list accompanying the April G.O.K. Newsletter had the following Sulcorebutia on offer under their Rausch collection numbers:

R 251	Sulcorebutia canigueralii
R 288	"        crispata Rausch n.n.
R 277	"        flavissima
R 290	"        frankiana
R 249	"        glomerispina
R 254	"        hoffmanniana
R 269	"        krahni
R 250	"        kruegeri
R 195	"        markusii
R 194	"        mizquensis
R 289	"        rauschii
R 191	"        steinbachii
R 64	"        sucrensis
R 66	"        tarabucoensis Rausch
R 266	"        taratensis
R 196	"        taratensis v. minima Rausch
R 260	"        tunariensis
R 284	"        vasquesiana
R 251	"        verticillacantha

Quite a few of these names seem to have appeared here on offer for the very first time, having only been mentioned before when we visited Herr Rausch on our 1969 Cactus Tour and in his description of his field work, which appeared in the Chileans No.14 pp 13 - 16.

Endogenous vivipary in Neoporteria Species by F. Buxbaum

(Translated by E. W. Bentley from K.u.a.S. 19.1.68)

For my detailed study of the tribe Notocacteae subtribe Neoporteriinae (not yet concluded), I received from I.O.S. Member Dr. Ing. Priessnitz freshly gathered fruits of some Neoporteria from his comprehensive Chilean collection.

Looked at from the size of the fruit and the length of the flower remains, these fruits had a very uniform appearance, whether they came from a 'typical' Neoporteria species or from "Neochilenia" or from "Horridocactus". Indeed the difference between Neoporteria multicolor, Neoporteria ("Neochilenia") chilensis, and Neoporteria ("Horridocactus") nigricans, was substantially smaller than that between Neoporteria ("Neochilenia") chilensis and Neoporteria ("Neochilenia") pulchella. Incidentally this is further evidence of the untenability of the genus dismemberment!

The fresh fruits are light carmine pink, elongated, egg-shaped to ellipsoid and bear the dried flower remnants, the appearance of which varies according to the nature of the receptacle of the flower. The fruit bears tiny scale-remnants, the podaria of which give rise to a distinct striping of the surface: in the scale axils are found tiny wisps of wool or else long, fine, white

wool-hairs which then however thickly clothe the receptacle, which usually bears bristles as well. Since the pericarpel of the flower extends as far as the point of attachment, i.e. there is practically no stalk-zone, then at the breaking-off of the fruit there remains at the base an open pore from which the seeds fall out but only to some extent. The fruit wall is relatively thin, dry-fleshy; after breaking-off it dries quite quickly, whereas it remains fresh for a long time on the mother plant.

Pulp is not present. The whole fruit is a hollow bladder which is remarkable in that the fruit wall stretches up to the base of the lowest filaments and thus includes the nectar-chamber of the flower. This chamber in the fruit is separated from the actual fruit cavity by a thin septum which is formed only from the carpels. Carpel tissue, plainly distinguishable from the axial (pericarpel) tissue by the white colouring, naturally covers the inner surface of the fruit wall and does not extend as far as the bottom, but ends somewhat above the lower third or quarter of the fruit, a circumstance which has already been commented upon by Hans. Oehme. The seeds occur on short individual seed-strings, which soon dry out and then collapse.

In three of the flowers investigated, namely *Neoporteria multicolor*, *Neoporteria* ("Neochilenia") *chilensis*, and *Neoporteria* ("Horridocactus") *pulchella*, a surprising appearance was presented when the fruit was sectioned: a number of the seeds had already germinated in the fruit cavity! Various stages of germination were to be found from the just emerged radicle up to - most remarkably - complete differentiation with well-formed structures, epicotyl podaria (tubercles) bearing a spiny areole, also completely developed seedlings. The young plantlets had their rootlets and root hairs pressed up against the fruit wall from which they evidently took up the water necessary for life and probably mineral salts also. This fact was shown in that the plantlets very quickly dried out as soon as the sectioned fruit wall wilted.

Especially striking was the fact that the seedlings exhibited a lush green colour hence, in spite of the endogenous origin, were able to form chlorophyll and assimilate. Biologically this is only to be explained in that the thin light-red fruit wall is fairly transparent and therefore lets through in sufficient quantities the red light important for assimilation.

All seedlings were in the lower part of the fruit and stood uniformly upright. This fact proves that they had already developed so far on the mother plant that they had been able to adopt the normal geotropic position.

This endogenous vivipary is biologically extremely interesting. The well progressed state of development of the seedlings shows that the seeds must have become ripe at least a week before the fruits had dried out or were broken off. One can observe elsewhere again in the sterile fruits of *Neoporterias* that they remain fresh on the mother plant for weeks.

The completely uniform occurrence of this phenomenon in fairly different species shows that we are not dealing with an accidental phenomenon. However, if the fruit breaks off these seedlings could not reach the open air through the narrow open pore and must therefore perish as soon as the fruit dries. One can therefore only conclude that the fruits, (at least of these species) mainly do not dry out in habitat, perhaps do not even fall, but instead rot in the mist-season - which can happen fairly quickly owing to the thinness of the fruit wall. In this way the young plants would all reach a nutritious substrate in the ground and be able to grow further. However, it would also be feasible that the fruits are eaten by ants and the seedlings so freed, but this possibility does not seem probable because the rootlets are so bound up with the fruit wall that they could not be separated from it without damage. It is also very difficult to grow-on freed seedlings. Only by the disintegration of the fruit wall without destroying the young roots can they develop further and only so would this peculiar vivipary make biological sense. Perhaps this would also explain the distribution of *Neoporterias* in the mist-zone of central Chile.

To investigate this question in habitat would be a rewarding job for a collector.

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## Comments on *Sulcorebutia* from D. Angus

Last year my *N. glabrescens* flowered and two of these flowers set fruit. These fruits elongated and were still colourful and turgid when most other seed pods on plants of other genera were brown and withered. So when I was in the greenhouse one night collecting seed off my plants, I removed these pods just like the rest.

As I pulled the fruit off the plant it left behind a short, thin green column which had been inside the fruit. This struck me as rather peculiar but it was not until next day that I was able to examine it closely when I discovered that it was in fact a seedling which I could only presume had germinated inside the fruit. Not only had it germinated and grown a minute green stem, but there was also the pair of dicotyledons to be seen and a minute spiny head above that. Then I discovered a similar seedling on the other areole, and the roots of both were anchored quite firmly into the felt of the areole so that, in the process of trying to extract them, I broke the stems. I was rather sad about this and felt afterwards that it might have been better to have left them alone and seen whether they would have grown on successfully.

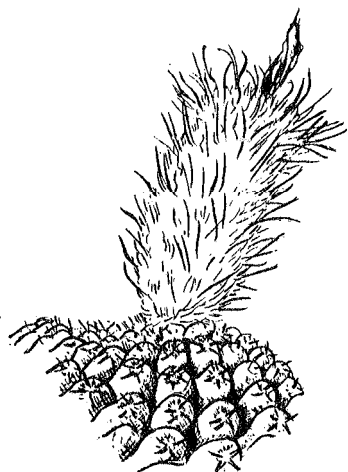
.... and comments from H. Middleditch

Two years ago I also had one or two flowers on my *N. glabrescens* and from these a fruit self-set. This fruit held up all the way through the winter and did not show any signs of withering until the weather showed distinct signs of improvement in spring. On removing the fruit and opening it up I found three seeds which had already germinated. I placed these in a pot but was not successful in getting them to grow on - although I feel that this could have been largely attributed to failure to keep the atmosphere in the immediate vicinity of the seedlings sufficiently moist.

Whenever I have failed to remove a fruit from any of my *Neoporteriae* whilst still turgid, the fruit just seems to disappear. Gradually, that is, not all at once - it withers and shrinks in the process and the fruit wall appears to become very thin and dry so that it dismembers to the touch like burnt paper, in due course. Presumably if the fruit wall does not contain any lignified tissue then it was indeed literally disappear into thin air over a period of time. I would be tempted to refer to this as deliquescence but there is probably a botanical (as opposed to a chemical) term for it.

One might venture the thought that this endogenous vivipary might have been a reaction of the plant to a steady reduction in the natural rainfall over the course of but one or two thousands of years. It is well known that this climatic phenomenon has occurred in the mid-Andes of north Chile and southern Bolivia and has been put forward as one possible cause of the wide development of swollen roots (or buried stems?) in cacti from this region. But if some *Neoporteriae* have developed a system of germinating seeds inside the fruit - where a constant humidity can be provided in comparison with the cycle of morning mist and midday roasting dryness of habitat macroclimate - why is this phenomenon confined to *Neoporteriae*? Why does not it appear on *Copiapoa*, *Sulcorebutia*, *Eriosyce*, *Neowerdermannia*, all of which have developed swollen roots (or buried stems?). And moreover, why does this characteristic swollen fruit appear on some *Neoporteriae* which emanate from central Chile which has a modest and reliable annual rainfall?

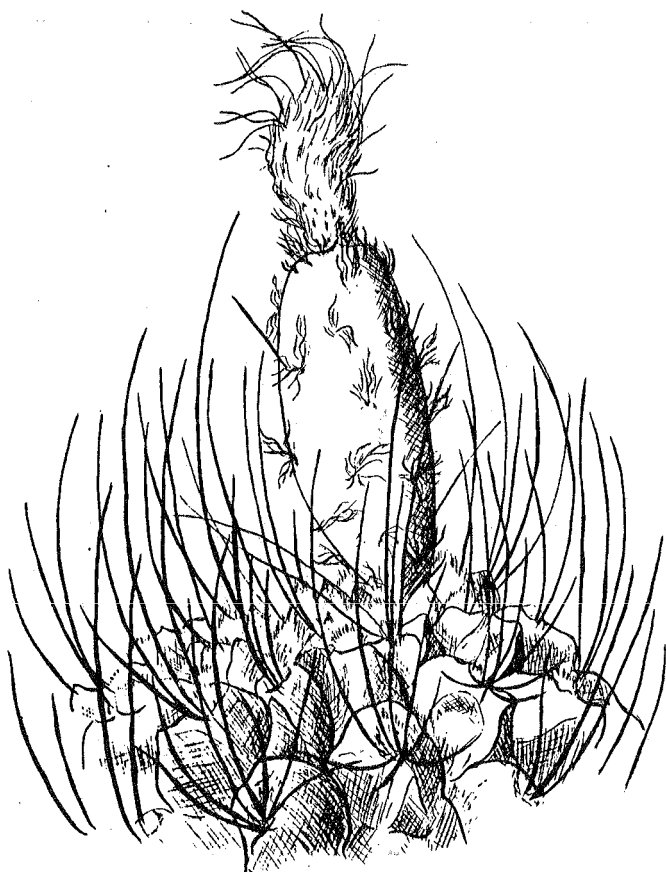
The term pericarpel which appears in the article by Prof. Buxbaum rather puzzled me, for I usually regarded the pericarp as the outside of the ovary whilst the remainder of the flower above was the perianth. However, on referring to Marshall and Woods "Glossary of Succulent plant terms" I find that the pericarp is the outer covering of the fruit. This is borne out by the terminology used in D.G. MacKean's "Introduction to Biology". Without Buxbaum's terminology of pericarpel, this would appear to leave us without any description for the outer wall of the ovary other than 'outer wall of the ovary'.



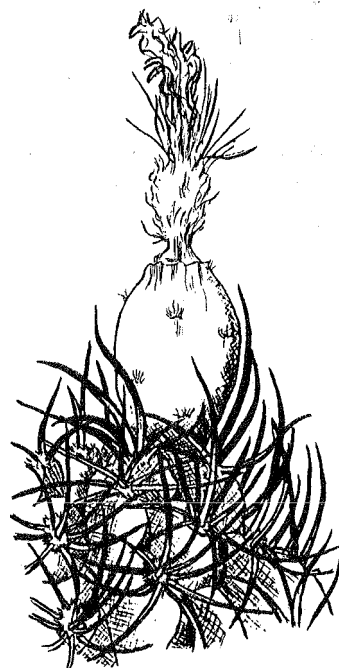
CHILEOREBUTIA KRAUSSII



CHILEOREBUTIA FULVA



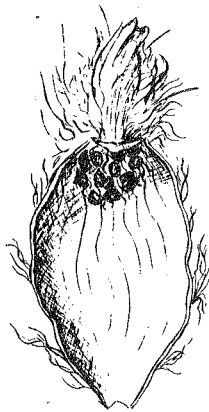
NEOCHILENIA NIGRISCOPARIA



PYRRHOCACTUS  
VALLENARENSIS



ISLAYA GRANDIFLORA

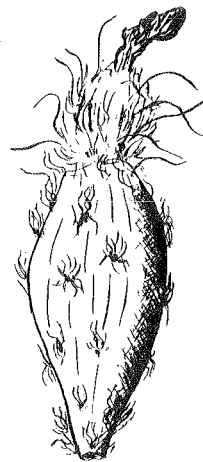


ISLAYA GRANDIFLORA

(SECTIONS)



NEOCHILENIA AEROCARPA  
VARIETY FULVA



PYRRHOCACTUS INTERMEDIUS — FRUIT DEVELOPMENT

In Buxbaum's "Morphology of Cacti" there is an Editorial note to the opening of Section Two which comments that: "The term pericarpel as used by Dr. Buxbaum refers to that receptacle tissue which surrounds the ovary. Previously in literature on cacti the pericarpel has been synonymous with 'ovary' but this is an incorrect concept. That is, the true ovary is composed of carpels only, without any adjacent receptacle tissue. The pericarpel on the other hand is that receptacle tissue which surrounds these carpels. The term pericarp applies to the outer covering of fruits and may consist of many tissues other than the receptacle". In other words, the ovary consists of the interior bladder and the pericarpel consists of its outer walls.

During 1969 I had quite a number of plants of *Neoporteria* set fruit and these fruits subsequently elongated and turned pink; some of these appear in the accompanying sketches by Mrs Swales.

.... and comments from G.J. Swales

The two *Chileorebutias*, *Neochilenia nigriscoparia*, and *Pyrrhocactus vallenarensis* fruits are sketched in order of the hairiness of the fruit. *C. kraussii* was so hairy that no colour of the fruit wall could be seen between the hairs. *C. fulva* and *N. nigriscoparia* were bright pink between the bristles whilst *P. vallenarensis* was a dull pinkish brown. The fruit on *Islaya grandiflora* was a bright pink - 'shocking pink' - and somewhat wrinkled when mature.

As will be seen from the cross section of the fruit of *I. grandiflora*, some of the seeds were adhering to the top of the fruit by the remains of the funicles (seed stalks or seed strings). No signs of the ovary wall were visible. With moving the plant around the fruit broke off and a few loose seeds were seen lying on the plant where the fruit had been attached. When the fruit breaks free from the areole it leaves a small circular hole in its base through which a little more seed escaped over a time. Perhaps this is a dispersal mechanism? It could be that some seeds are shed when the fruit breaks off and that the rest are shed gradually as the fruit blows along in the wind. (See *Chileans* No.8 p.7 - H.M.)

The fruit on *Neochilenia* (*Chileorebutia*) *aerocarpa* v. *fulva* was found to be completely infertile when it was opened up for drawing. However, the shrivelled ovules attached to their funicles were clearly visible enclosed within what is presumably the ovary wall and roofed by the base of the corolla with the tubular style inserted in it. The remainder of the fruit consisted of a completely empty structure - the pericarpel - with the characteristic small circular opening at its base. Presumably the ovary wall only breaks down when the ovules have been fertilised and mature seeds produced - in the manner illustrated for *Islaya grandiflora*.

The *Pyrrhocactus* fruits are three different fruits from the same batch of flowers on a single plant, showing stages in the elongation of the pericarpel. All three fruits were infertile when opened up. For this reason, the fruits are possibly not the normal size, not being distended at the upper end by the mature seeds. It seems a little strange that the fruit have developed at all, the flower not having been pollinated - this comment also applying to the *Neochilenia* fruit.

All the fruits are drawn  $1\frac{1}{2}$  times full size.

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We should be pleased to hear from members who could loan slides of *Neoporteria* in fruit, for copying for the slide library - A.W.C.



## A SIGN OF LIFE FROM WALTER RAUSCH. LIMA, 8.1.70.

(Translated by W. Keugler from the G.O.K. Newsletter February 1970).

I believe, at long last, it is time for me to send a report. We have a long journey behind us and have not seen any mail for a month. Now our Peru excursion is nearing its end and our journey will probably be of interest to you. Our route took us via Lima, Matucana, San Eulalia, Churin, Oyon, Raura, Junin, Tarma, Huasahuasi, Huancavelica, La Esmeralda, Ayoccho, Andahuaylas, Abancay, Chalhuanca, Cuzco, Urubamba, Huambatio, Paucartambo, Urcos, Oconyote, Tirapata, Asillo, Ayopata, Chuljaco, Jura, Arequipa, Atico, Chala and Lima, to make just a few places. A few other interesting places are still open to be seen, but because of strikes and other obstacles, we were not able to get there - but we hope to do so.

Tomorrow we set off for Bolivia. On our way we shall go via Juquiu and Pampa de Arrieroa (Arequipa), finally to Puno - La Paz.

Up to now we have shuffled over 450 km (about 300 miles - W.K.) on foot and now have a better knowledge of the Peruvian Lobivia. Of course, this is only possible if one can see for oneself. Literature and maps are misleading. For instance: travel to the Rimac - or Churin - valley and you will find, with the best knowledge and belief, only relatively very few species of cacti. On the other hand, one could describe 20 or more 'species' because almost every plant looks different to the other. One could write a whole book about it. And what has been done to Haageocereus and Mila is inconceivable to me! (Meaning in literature - W.K.)

It is 30 degrees Celsius here in the shade and I often think how nicely we have managed it - i.e. getting away from the snow of the European winter. We also have ice and snow here, but only at an altitude of 4,500 m (about 14,000 ft. - W.K.)

I have had a stubborn cough, which could not be got rid of. A thought occurred to me: Of course! we have an apothecary's shop with us! Now, what can we take? Try anything! Well, here is something already: Antibiotics with penicillin. But, after the third powder, I still had the cough and now boils in the face as well. (Herr Rausch describes a classical penicillin allergy - quite harmless. Naturally, penicillin is no remedy for a cough. The cough itself is the irritable dry cough or altitude cough which, if it remains too long, can easily turn to pneumonia at such heights - Ed. G.O.K.)

But, as you see, I have overcome both boils and cough. Perhaps it was because we kept a copious table! We have had weeks when we had only one hot meal a week. Our belts were pulled tighter and tighter, but therefore we had less weight to carry. Of course our clothing has suffered also very badly. A string vest, for example, parted into binder and bra - both quite useless to me. Or the confounded trousers! Naturally the buttons got lost just where they are needed most. Now that I have sown them on almost entirely with fine wire, the cloth rips besides them. I was thinking, perhaps if I put them on back to front it should be quite practicable.

In spite of all these difficulties there are five or six new names of new cacti due already - but names which do not fit in with any others.

Please take these lines as a sign of life from us and share this with the G.O.K. Cactophiles should not forget that we also, at our present task, have to fight many everyday problems; but they should also not forget that every cactus plant in the collection had to be found at one time.

## THE GENUS CEREUS

This particular genus can probably claim to have the longest established name in the cactus family. The authority for this genus is quoted as Miller, who described it in the 1754 abridged edition of the *Gardener's Dictionary* - but he acknowledged its prior publication by P. Hermann in 1698 and by Tabernaemontanus in 1588. Even before that time it appeared in 1576 in the "*Nova Stirpium Adversaria*" by Pena and Lobel (Antwerp). It may be safely said to predate the genus *Cactus* which was established by Linnaeus in 1753.

Many collectors may well regard the plants in this genus as being rather common, easy of growth and simple in nomenclature. However, even a brief perusal of Britton and Rose and of Backeberg's *Die Cactaceae Vol. IV* reveals that no habitat at all can be quoted for almost one third of the present named species; there are also serious doubts as to the validity of the names or of the correct description, for several species.

Plants of this genus are found very widely distributed throughout eastern and south eastern Brazil, Uruguay, Paraguay, northern Argentina and the Bolivian Chaco. Two species - *Cereus insularis* and *ridleyi* - are found on the arid island of Fernando Noronha which lies nearly three hundred miles out in the Atlantic Ocean off the north-east corner of Brazil. Another species, *Cereus hexagonus*, comes from the north of Venezuela and adjacent islands. Yet a third isolated species has been found in the north-east of Peru - *Cereus trigonodendron* - but this only has three angles to the stem and carries a red flower, so that its very connection with this genus is in doubt.

There is very little information available for such a 'common' species regarding its circumstances of growth. By inference, the bulk of the species - including those which emanate from the Chaco - would appear to grow at a fairly low altitude. *Cereus comarapanus* for example, is described by Prof. Cardenas as occurring at an altitude of 200 m. (650 ft.) but the same author refers to *C. huilunchu* being found at 2,000 m. and *Cereus validus* at between 2,000 - 2,600 m., all three in the eastern Andes of Bolivia. *Cereus jamacuru* is reported to be widely distributed over the Brazilian province of Bahia, including the vicinity of Joazeiro, which infers that this species probably occurs at least up to 1,500 ft. altitude.

All species are night blooming and (with the sole exception of the red-flowered species of doubtful affinity referred to above) the flowers are white. The flower tubes are long and slender, glossy green with very few vestigial scales and quite naked. When the flower is withering the petals separate as a body from the ovary, the stigma remaining attached to the ovary; this will occur two or three days after the flower has opened and serves to distinguish this genus from the genus *Monvillea*, where the withered flower remains attached to the fruit for a much greater length of time. If the flower remains do become detached from the *Monvillea* fruit, all the flower remains part from the fruit.

The naked flower tube distinguishes this genus from *Trichocereus*, which also contains a considerable number of white, night-flowering species but all species of *Trichocereus* have a scaly and hairy flower tube. - H.M.

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Comments on *Cereus* in Flower from H. Middleditch.

In spring of 1969 my *Cereus aethiops* put out two buds, which rather surprised me as it was only about 15" high. However, I see from Backeberg's *Kakteenlexikon* that this species is only expected to reach about six feet in height which probably makes it the smallest of this genus and certainly a miniature in comparison with the tree-forming species. These first two buds only reached about one or two inches in length when they dried up and fell off. Later in the year, in August, a further two buds appeared and suspecting that inadequate water might have been held to account for the loss of the first two buds, I plied the plant liberally with water daily. I must not have been sufficiently liberal or sufficiently frequent with the water, however, for

again one bud dried off when about two inches long. The other one did open successfully, as shown in Carl Lazzari's accompanying sketch.

I also have a rather ancient *Cereus* of some three feet in height which was acquired under the label *C. alacriportanus*. This plant put out four buds in spring and here again they all dried up and fell off when barely one inch long. I suspected that the plant - which had exhibited no signs of new growth for some three years - was suffering from root mealy, so in August I decided that it was time that I got down to examining the roots. After a struggle it was persuaded to part company with its pot when I discovered to my surprise that there was not a sign of root pest; it was, however, quite clear that the plant was decidedly rootbound in its pot, so I looked out a suitably larger pot - plastic this time - and repotted it.

That was on the Saturday and by the following Thursday it was found to be carrying five robust new buds spread along the stem over three different year's growth. Four and a half weeks later the first flowered opened; the flowers would start opening at about eleven o'clock at night, long after dusk. They were found to be still open in a brandy glass shape the following morning - they opened each on a different day and on two occasions the following day was fully overcast and dull and the flowers had hardly closed up any further by noon. I suppose that the flower must have been really wide open at some time during the night but I never saw it fully open.

The day following that on which one flower closed, I cut one of the flowers in half longitudinally. Much to my surprise, the anthers which had been a rich cream colour when the flower was seen more or less open, were now covered with a coating of grey pollen. I wonder why the pollen was only exposed when the flower had commenced to wither - is it nature's means of ensuring only cross pollination - or was it that my flowers did not really open completely? Perhaps our subscribers in Australia and New Zealand who find a *Cereus* flower is not the rarity it is in Britain, might tell us whether you find the anthers change colour whilst your flowers are open.

..... and comments from D. Angus

My plant of *Cereus chalybeus* must be a rooted cutting as there is no sign of the thin neck always visible on a seedling plant. It first flowered in 1968 when it was just under 18" high, three buds appearing but two of these aborted.

This year (1969) the plant has made little or no increase in height but four buds were formed, appearing about the middle of July and all flowered about a month later. The flowers (including the tube) were five inches long and three inches diameter, with bronzed green outer petals and white inner petals; the glossy green tube was infused with a purplish-violet colour, this infusion being less marked towards the petals. The tube carried a number of longitudinal markings - so shallow as to hardly deserve being called grooves - and a number of scales widely spaced on the tube but rather less widely spaced on the ovary (or pericarp). These scales were 2 to 3 mm broad and deep, pinkish bronze.

The flowers opened in the evening about 8 p.m., opening to a cup-shape with the inner petals still slightly incurved. The flower was about  $3\frac{1}{2}$  inches in diameter when it opened - although I do not know if it can properly be described as having opened since the innermost petals were barely parted. It was seen to be "open" at 8 p.m., at 10 p.m., also at 3 a.m. and at 10 a.m. the following day; that afternoon it started to fade.

Even though the flowers were not fertilized the tube and flower withered and fell from the ovary, the break between the two being so precise and clean that one might almost think it had been cut with a fine, sharp knife. The ovary in turn became detached a few days afterwards.

Since I repotted the plant this year it has not flowered again.

.... and comments from J.D. Donald

I have grown a number of *Cereus* spp. over the years and have generally ended up by planting them into a bed rather than trying to cope with the top heavy monsters they grow into even in an 8" pot. Of course once in the bed they grow too rapidly and then have to be topped - after which they are never the same.

I have had most success in flowering the odd one or two when they are still in a pot and relatively speaking quite young. *Cereus jamacaru*, *aethiops*, *chalybaeus*, and *huilunchu* have all obliged at one time or another. There seems to be no way of telling when or why they will flower as young plants. Certainly they don't want to later on, when bedded out, in contrast to *Trichocereus* which usually obliges when big enough.

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

I have a *Cereus azureus* which is two feet high, branched, and bedded out with a free root run. This year it produced fourteen buds all at one time and all bloomed. The flowers are not quite four inches in diameter and are pale pinkish in colour. The flower tube was fairly deeply ribbed and carried a few scales. The opening of the flower is preceded by protusion of the stigma by about one to five centimeters, the lobes of which expand about 8 hours before the flower opens.

The flowers open in the evening, usually an hour or so before dusk, being 'brandy glass' shape at first and later become fully expanded; the flower is fully expanded the following morning during which the flower closes partially and never seems to expand fully again. If the weather is sunny they will wither after opening, but if the weather is dull they may partially open once more after the initial opening but never seem to expand fully again.

.... and comments from E.N. Ross

A few years ago I obtained a 12" high seedling of *Cereus peruvianus* from Ivor Newman. It put on a further foot or two of growth in my collection and then I decided to plant it inside the greenhouse with a free root run, in a bed. In response it put on almost two feet of growth the following year. At the beginning of 1969 it was about eight feet high and getting fairly close to the glass, so as a temporary measure I took out the pane of glass immediately above the plant. It probably put on almost another two feet of growth during the year and as it was obvious that I could not go through the winter with a hole in the greenhouse roof, I decided that the plant would have to be removed.

Thus it came about that one day in August I set up some steps beside the plant and climbed up, preparing to lash a stout pole and bagging to the plant before digging it up. To my surprise I discovered a number of buds at the top of the plant, which had previously been too far away to be obvious. There proved to be ten buds all told which came into bloom a few weeks later. The flowers started to open before dusk but only opened wide after dark - they must have been all of six or seven inches long and broad.

When flowering was over the delayed removal had to be carried out. I was surprised to find that there was no tap root on the plant, just a main spreading root and subsidiary spreading roots. Although there was only twelve inches of soil down to the bottom of the greenhouse foundations none of the roots had grown below this and out beyond the greenhouse walls.

I noticed that the base of the stem had thickened so much during the last year of growth that it had pushed a little bank of soil up around it.

.... and comments from G. Foster

About nine or ten years ago I grew some plants from seed of *Cereus pitahaya* (synonym *C. obtusus* - H.M.). I kept one of these which grew to about five feet high in the first five years, when I repotted it into its present container - a wooden box - and it put on a further five feet of growth in two or three years and then stopped growing altogether; it is not far off the greenhouse roof so it is stopping in its present container and does not receive a lot of water as I don't want to encourage any more growth. It now flowers quite well - there were one or two flowers in July of this year, another flush of eight or ten flowers in August which finished early in September and now (mid September) there are another eight buds coming along. The flowers will be about six inches in diameter when they open.

.... and comments from J.C. Lindsay

My *Cereus jamacaru* flowered for me regularly for several years - in 1968 it had five blooms in two series. Unfortunately I lost it this year when outside while the old greenhouse was being removed and the new one going up. However I now have a new one about 18" tall - a rooted cutting - but just on the small side for flowering. I have potted it up and expect about two years of growth, then flowering when it again becomes potbound. Last year both my plant and that of a local fellow-collector produced about six flowers each, but in our experiences they must be about three feet tall and potbound before flowering.

What I would like is another plant of a different clone, to crosspollinate it and fruit it. I have one or two youngsters of different species coming up, with this in mind.

The flowers on my plant opened pretty fully; they were white inside and greenish-olive outside - and of course absolutely hairless on the long tube. The flowers appear in late August and generally start to open at about 8 p.m., i.e. about sunset. I tend to think that the opening stimulus is temperature fall, rather than a decrease in the light, because it is usually quite light when they are half open.

.... and comments from C.J. Lazzari

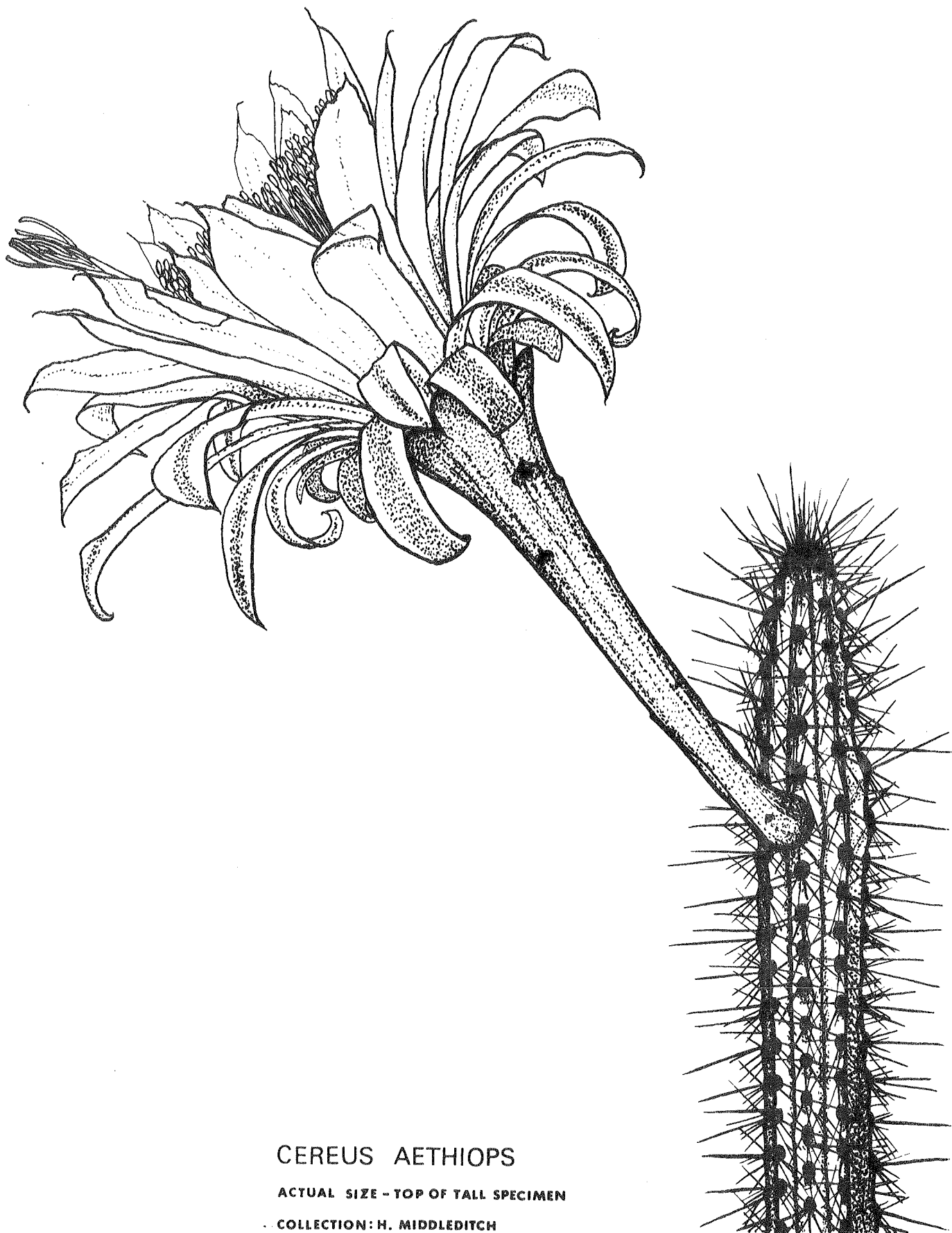
The flower of *Cereus aethiops* depicted here was evidently just ready for opening when the plant arrived early one August evening. It was kept indoors and the flower gradually opened, being fully open by 10 p.m.: it then took about two hours to draw although some petals did move very slightly over that period. The flower was quite dead the next day: on the day after, the flower fell off leaving the ovary attached to the plant. The surface where the corolla had parted from the ovary was remarkably smooth and free from any jagged edges - it was just as if it had been cut clearly with an exceedingly sharp blade and was a feature which I do not recollect having noted previously on any other plant.

For the benefit of the owner of the plant who was not able to see the flower, I would add that there were very few scales on the tube and these were very small. The outer petals (the sepals) were a pale rose brown, the colour being rather more intense in the midstripe, the inner petals being white. The stamens were golden yellow in colour.

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We have one slide of *Cereus* in flower in the slide library: we should be pleased to hear from any members who could loan any slides of *Cereus* in flower for copying for the slide library -

A. W.C.



CEREUS AETHIOPS

ACTUAL SIZE - TOP OF TALL SPECIMEN

COLLECTION: H. MIDDLEDITCH

Carl J. Lazzari

## SOME NOTES ON NOTOCACTUS BUENEKERI collated by H. Middleditch.

Following our notes on *Notocactus buenekeri* in *Chileans* No.12, p.82, R.E.Hollingsbee observes "I feel it is not really surprising that the seed pod was not clearly visible on Alan Craig's plant. There is a terrific amount of wool on the flowers of *buenekeri*. At first this is almost black - they are at this stage as I write (Mid-April), about 2-3 weeks before I estimate they will open.

I have an unrooted scion of about 3" diameter with offsets and both the plant and the offsets are producing buds quite normally. I expect that this will delay development of roots. The stock of this plant (*T.spachianus*) was an unexpected winter casualty".

In response to this, A.W.Craig comments that "the seed pod on my *buenekeri* was nearly missed more due to its small size rather than the effect of the residual wool; the seed pod was probably even smaller than a typical *Rebutia* seed pod.

The seed pods observed on two plants in the collection of D.Angus, bright green, about 6-7 mm diameter, with a few tufts of dark brown hairs on its surface and the very hairy flower remains above, are quite different from those on my own plant".

My own plant started producing first signs of buds about mid-February and was encouraged with small but frequent drinks of water. Owing to the dreadful cold and damp weather we suffered in March and April, I discontinued all watering for about three weeks around Easter; no doubt as a result of this, what had been a ring-and-a half of little yellow starter buds merely culminated in two developing buds, the remainder having aborted. This would suggest that it might be as well to water steadily once buds have appeared.

Like R.Hollingsbee's plant, my buds initially seemed to be yellow hairless points but they rapidly became thickly clothed with almost black wool and only after reaching some  $\frac{1}{2}$ " or so in height did lime-greenish yellow petals show through the top of the bud wool.

Also blooming in 1969 was the *N. buenekeri* in Mrs.Z.Andrews' collection "one of two plants, one obtained from E.Germany and the other - which flowered - through the Chileans. Both are grafted but on different stock. The two flowers opened very late in April. They started off as tiny yellow buds, then became covered in brown hairs until finally the golden-yellow petals appeared. There is no suggestion of lime in the yellow and the whole plant is exactly as described in Backeberg's *Lexicon* under *Parodia buenekeri*.

"There is a marked difference between the centres of my two plants. The flowering one has long creamy white bristles in the centre but the other one has stronger brown ones, reddish at the base".

A plant observed in D. Angus's collection in early summer also exhibited the distinctive reddish colour at the base of the dark coloured spines, which form a series of 'brushes' roofing over the growing point of the plant. By the end of summer the whole of the spines were very pale horn coloured - almost white, in fact. Precisely the same sequence was observed on a plant in the collection of A.W.Craig.

K.Halstead adds a comment there that "With regard to *N. buenekeri*, all the plants that I have seen (at least six) have glassy white spines, bristle-like with only the faintest suspicion of red on the base of the spines. All the centrals on my plant are long, mostly well hooked and without any suspicion of red at the base or elsewhere on the new spines, which as D.Angus so aptly quotes - form a series of brushes roofing over the growing point of the plant. Of course the official description indicates a wide variation of spine colouring and J. Donald has commented in a previous edition of the *Chileans* that a variety with darker coloured spines has been described as *v. senescens*. As for the seeds pods being small this is extraordinary. Mine are very apparent, 10 mm in dia., (cf. with the official description of 10 mm.), bright green and hardly hidden by the brown wool above. This is confirmed by the size of the fruits on P.Down's plant. I am wondering whether the reason for the pod on A.Craig's plant being small was due to the lack of

adequate root system. The photo of A.Craig's plant is almost identical with mine and the form quoted by Mrs.Andrews, the one with the long creamy white bristles in the centre is similar too".

In response to the query about the root system on his plant, A.W.Craig comments "My plant is now in a 5 $\frac{1}{4}$ " pot which is filled with roots and the seed pod has been just the same small size again this year".

My own *N. buenekeri* also shares with *R.Hollingsbee*'s the common characteristic of having offsets - in my case these are about half way up the plant and I had previously mentally regarded them as purely adventitious pups, rather like the odd one half way up both my *N. scopa* and the plant labelled *N.floricomus*, neither of which seem inclined to progree beyond the large pea size. However, it may be that *N. buenekeri* clumps naturally, a somewhat uncommon characteristic amongst *Notocacti*.

On the same thought, I am especially struck by my *N.horstii* on its own roots which is also just starting to put out a pair of offsets from near the base.

J.C.Lindsay adds to this the observation that 'with the *Notocactus scopa* complex, I find that buds often abort and the next season turn into pups, away up at the top of the plant, which tend to spoil its appearance if not completely removed'.

K.Halstead also comments that "I have on loan to me a large grafted *N.alacriportanus* (closely related to *buenekeri*) with several offsets, some of which are half-way up the plant and swelling. The largest, 35 mm, is at the base and the smallest, 5 mm, mid-way up. This plant produced 27 flowers in the fortnight ending 27th May including two pairs on two of the offsets. All were very much similar to smaller versions of *apricus* type flowers, yellow with thick red midrib. The spines on this plant are shorter than those on *buenekeri* and perhaps more creamy white but the hooked centrals are present only on the main body, which is 80-100 mm in diameter, having grown slightly elliptical in shape. There are no hooked spines on any of the offsets at present".

A.W.Mace observes that "The flower buds appeared on my plant of *buenekeri* about mid-April opening in early May. They did not show any lime yellow colour when small. The seedpods were the same as described by K.Halstead, green, 7-8 mm in diameter and not at all hidden by the wool. The spines are of the glassy white type, only the central hooked spines being a reddish brown in colour. My plant has one offshoot about 50 mm in diameter about halfway up the main stem which is about 150 mm in diameter. Growth of the main shoot is decidedly elliptical, the major and minor axes of the ellipse having reversed each growing season for the three years I have had the plant".

A further observation on the flower of *buenekeri* comes from A.W.Craig - "When the flower first opens the filaments on my plant are bent right over towards the style so that the anthers are practically facing downwards; shortly after the initial opening of the flower they commence to straighten up and stand up in the fashion normally expected".

A *Notocactus* (*Parodia*) *uebelmannianus* n.n. from this same *buenekeri-alacriportana* - *brevihamata* complex, with long thin pale yellow spines, put out two buds early this spring. These, too, were quite close to the crown and almost entirely free of woolly hairs when first seen, but after about a week the yellow of the bud was covered by a mass of fine dark grey woolly hairs. The flower is now awaited. This plant must be HU45 referred to by de Cocker in his article above, not to be confused with *Notocactus uebelmannianus* Buining, HU78 and HU81.

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We have slides of *N.buenekeri* in flower in the slide library - A.W.C.



On my expedition from Antofagasta I have only seen occasional *Eulychnias*. As I definitely wish to know as much as possible about them, I pursue my immediate objective - reaching the coast; but that is more easily said than done because the rocky cliffs are exceedingly steep and the flat zones which separate them are formed of fine sand and gravel. Nowhere have I discovered the least trace of vegetation.

At last I came to a spot where there was a steep descent to the sea, and I was able to have a fascinating view of the waves and the seagulls. It was where I found in the shade of a half-dead *Eulychnia* one of the finest *Copiapoas* - *Copiapoa aurata* n.n. Knize, of which the long and stiff spines contrast strangely with the desolate surroundings. This was certainly one of the most remarkable discoveries of my trip and an exceptionally beautiful species. I examined the site very well, but I only found two plants and then nothing more! But I was not discouraged and continued to explore the dangerous loose rocks at this spot; it was only much later, when I was almost desperate, that I found two others. This splendid *Copiapoa* remains small - its height is 50 mm at the most but it possesses a much longer tuberous root which often reaches 300mm in length.

One must find a name for these plants of which the root is much more impressive than the aerial portion; why not call them 'subterranean cacti'. This would particularly encompass those plants of which the whole comprise a distinct group, composed of *Neochilenias* and some others, such as certain *Copiapoas* amongst which is *C. aurata* described above, and *Copiapoa hypogaea*.

The landscape between Taltal and Paposo is rich in diverse forms of xerophytes: the columnar *Eulychnia* and *Trichocereus*; *Opuntias*; multi-headed *Copiapoas* which form veritable mounds; the 'subterranean' *Copiapoa* and to the small globular *Neochilenia*. Not only does this diversity concern the shape and the habit of the plants, for although this territory is not very extensive and possesses a uniform and quite predictable type of climate, yet it hides an extremely varied collection of flora.

Gradually as time passes, one must surely return to reality and agree that many of the supposed novelties have been known for many years. Moreover, one must likewise admit that the majority of amateurs attach far too much importance to superficial variation of imported plants. In order to put an end to this sort of error or heresy, there is scarcely but one single remedy: the conscientious study and investigation of the natural habitats which alone will permit of a precise statement of the extent of the variations and will avoid the establishment of so-called new species or varieties of which the taxonomy and the botanical nomenclature are only constructed if one wished to clothe them with a somewhat scientific character. Following from this, it would be much more logical to speak of varieties, sub-varieties, or local forms.

One example amongst many concerns *Neochilenia hankeana* which I have had an opportunity to study well at a number of habitat locations between Taltal and Paposo: I have moved around quite a bit in the central part of this territory between Punta de San Pedro as far as Serra Paposo across the Sierra Esmeralda. In a number of places, I have found plants which, in collections, bear diverse names or 'species nova' with a solitary reference number. Amongst these, I would quote notably *Neochilenia paucicostata*, *N. paucicostata* var. *viridis*, *N. taltalensis*, *N. hankeana* v. *taltalensis*, *N. fusca*, *N. hankeana* var. *minor* and many others besides.

All that one can say for certain is that all these plants are closely related and perhaps likewise that they only constitute one species, be it as such, or be as it varieties or local forms. The flowers vary from white to yellow or to rose-red and their epidermis is just as variable. But it is not necessary from that to fall inevitably into the opposite error, since it is no more logical to assert without more ado that all these names are only applicable to one solitary species therefore the 'micro-differences' are without any significance. It is a simplified solution which many authors have endeavoured to justify but without success up to the present.

Every amateur, with a little experience, who uses his eyes, can assess and establish the relevant differences for themselves. On sowing a known species, he will establish for example that certain seedlings have a pale green colour, others dark green while yet others are brown. Is this a sufficient reason for concluding that these seedlings have originated from different species?

In so far as this matter concerns me, I prefer to adopt a middle-of-the-road attitude and content myself with asserting that certain species are very variable and that they produce progeny with marked differences while in other species this phenomena is not exhibited. In the case of *N. hankeana* cited above and of other similar instances, there exists a sort of 'internal dynamism' which cannot be overlooked. These plants multiply in habitat and enlarge the area of distribution of the species.

One has already mentioned on several occasions previously the determining influence which the climatic differences at the different places in the area of distribution, the different nature of the soil, and the effect of atmospheric precipitation, could have on the variability of the species.

However, in the case with which we are concerned, I am sufficiently tempted to believe that in the foreseeable future, one will not speak only of one single species - *Neochilenia hankeana* and all those other types which would be associated therewith in status of varieties, of local forms, or - simplest of all - synonyms. In one place - to be exact - at Paposo, I found numerous *N. paucicostata* and *N. fusca* with an entire series of intermediate forms of which I could very easily have "made" numerous pseudo-novelties.

We must never lose sight of the fact that our system of botanical classification with all its subdivisions of families, groups, genera, species, and varieties is an invention of man's understanding of the plant kingdom but which nature does not bother herself with and does not care to conform to an artificial and purely theoretical system.

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#### LIST OF PLANTS collected by K. Knize between Antofagasta and Taltal

Kz 67     *Neochilenia paucicostata* v. *viridis*.

Found in abundance in the vicinity of Cerro Paposo.

Kz 68     *Neochilenia violaciflora*. Nom. prov.

Small, up to 50 mm dia.; ribs low, barely distinguishable; radial spines up to 5 mm long, white, shiny, 3-4 central spines. Flower violet up to 50 mm dia. with a green tube furnished with sparse little woolly tufts.

Kz 69     *Copiapoa haseltoniana*.

Branched groups, each head reaching 500 mm dia. Spines yellow or brown. Found on the banks at the approach to Paposo whilst the *Copiapoa gigantea* of Backeberg only exists beyond Paposo, 2 Km away and also reaches an even greater diameter (up to 200 mm); growing point with an orange woolly cushion and spines likewise orange which forms the only characteristic which allows *Cop. haseltoniana* to be distinguished from *Cop. gigantea* which appears, from that, to be a local form of the first-named. Further on, at 25 Km. north of Paposo exists one other form much smaller (100 mm in dia.) and with much shorter spines which I have named *Cop. haseltoniana* var. *brevispina*.

Kz 72     *Cop. echinoides*.

Found in barren soil above Antofagasta. White pruinose coating and very dense spines.

Kz 75     *Pilocopiapoa solaris*. syn. *Cop. conglomerata*.

One of the most massive Chilean cacti which forms groups reaching 2.5 m in diameter El Cobre.

- Kz 77     Copiapoa cinerea.  
Very variable species of which I collected especially some examples with brown spines. To the south of Taltal at the same locations as Cop. *krainziana*.
- Kz 79     Eulychnia iquiquensis.  
Tree-like columns endowed with straight spines reaching 180 mm in length. Taltal and Paposo.
- Kz 80     Copiapoa haseltoniana form.  
With brown spines; outskirts of Paposo.
- Kz 88     Neochilenia taltalensis.  
These according to me are identical with the *Neochilenia hankeana*, or at the most, one of its varieties, in the same way as *N. fusca*, *N. paucicostata*, etc. In effect, all these plants are met with in the same places more or less in plentiful number. It appears to me therefore logical to reunite them to the oldest known species, *N. hankeana*, of which they could eventually constitute forms or varieties.
- Kz 89     Cop. rubriflora.  
A particularly tenacious *Copiapoa* which is found wedged in the crevices in the rocks. Its flower is almost red or, more exactly, a dark reddish yellow. One of the rarest sorts. To the south of Taltal.
- Kz 90     Copiapoa sp.  
Round about El Cobre, with quite a close resemblance to *C. marginata* or *ferox*.
- Kz 92     Cop. cinerea.  
At this locality I have only collected plants carrying 1 to 3 spines; to the east of Taltal.
- Kz 95     Eulychnia iquiquensis. (or more precisely a form of *Eulychnia spinabarbis*).  
Plants endowed with especially long spines (up to 200 mm). Above Paposo.
- Kz 118    Copiapoa humilis.  
This is a Chilean plant well distributed round amateur collections, but in Chile it is difficult to find, it being suggested that it is damaged by animals. Most often 50 to 70 mm dia.: in groups on flat ground. One can denote 2 or 3 different forms which vary from green to grey-brown, the crown generally furnished with strong spines. Above Paposo.  
Copiapoa aurata nom. prov.  
Golden spines, small, up to 60 mm dia., very rare in habitat. Slight resemblance to *C. krainziana* but is equipped with much more robust spines. To the south of Taltal.  
Cop. cinerea var. *albispina*.  
Body solitary with white spines. Between Taltal and Paposo.

## ANNUAL REPORT AND ACCOUNTS 1.4.69. to 31.3.70.

Income		Expenditure	
Subscriptions	£235. 1. 9.	Printing	£262. 5. 7.
Subscriptions, '70-'71	47. 3. 0.	Postage and Stationery	59.19. 8.
Sales of Year Books	17.18. 6.	Plant Purchases	63. 2. 5.
Sales of Back Numbers	104. 0.10.		
Plant Sales	93. 6. 4.		
Donations, etc.	6. 1. 9.		
Bank Interest	5.13. 7.		
C/f from previous year	134.14. 8.	Balance c/f	258.12. 9.
	<hr/>		<hr/>
	£644. 0. 5.		£644. 0. 5.

It will be seen from these accounts that the cost of preparing, printing, and despatching our Journal again well exceeded subscription income, but by virtue of income from other sources our year-end balance continues to be healthy. In view of our present sound financial condition it is to be expected that the current year's Journals will continue to be published at less than cost price.

A proportion of the income from plant sales represents equivalent subscriptions from countries with exchange difficulties; indeed, the profit on plant purchases as such was fairly slim. The slide library balanced income and expenditure and the profit on seed sales is being applied to the purchase of seed from South America.

We now find our Journal takes about 9 to 10 weeks for the printers to produce - perhaps in measure due to its increase in size. This has caused an extension to the time between the appearance of each issue.

A disturbing feature of late has been the increase in the number of Journals lost in the post and it would appear prudent to question our current practice of replacing these without charge.

It is a pleasure to record both the continued support given by our translators and illustrators and to welcome, in both fields, further subscribers who are now contributing to the interest of fellow-members.

I should be very pleased to hear from any member who would be able to undertake the compilation of a detailed index of past issues. A partially completed index is available which could be used as a basis - this was commenced by a member who has been unable to continue with it to completion.

- H.M.

## CONTINENTAL CACTUS TOUR 1971

We have selected June as the month in which to travel on our previous Tours, as this avoids both the heaviest tourist traffic and the high season charges of midsummer. It also facilitates our Travel Agents' choice of hotels and avoids the excesses of a midsummer continental heatwave.

In selecting mid- or late- June, however, we seem to miss the better part of the flowering season, so on our 1971 Tour it would seem worth selecting either May 29th to June 12th or May 22nd to June 5th, for a change. This date will be finalised by mid-December, by which time an outline itinerary will have been arranged. A firm booking accompanied by a deposit of £4 per head will be due in early January, the residue one month before the date of departure; estimated cost remains at the time of writing (June) at £65.

We have already received a number of bookings; would anyone desirous of making a provisional booking or requiring further information, please contact me.

H.M.

## STUDY GROUPS / ROUND ROBINS

Cleistocacti	A.A.Sadd, 26 Carlisle Street, Island Bay, Wellington S.2, New Zealand.
Copiapoa	D.J.Lewis, 16 Brundall Crescent, Cynntwell, Cardiff CF5 4RU.
Epiphytes	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ.
Frailea	J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland.
Gymnocalycium	G.J.Swales, 5 Hillcreast, Middle Herrington, Sunderland, Co. Durham.
Hydroponic Culture	P.G.Hallett, Llaregyb, 20 The Garth, Bull Bay, Amlwch, Anglesey.
Lobivia	R.E.Hollingsbee, 46 Markland Road, Dover, Kent.
Matucana/Borzicactinae	E.W.Barnes, 22 Coniston Grove, Ashton under Lyne, Lancs.
Mediolobivia	J.R.Chapman, 5 The Crescent, Raunceby Hospital, Sleaford, Lincs.
Melocactus/Discocactus	Mrs.L.Teare, Dellfield, White Horse Lane, Finchampstead, Berks.
Miniature Opuntia	Contact the Chileans.
Neoporteriae	D.Rushforth, 80 Cheltenham Road, Gloucester GL2 0LX.
Notocactinae	K.H.Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton.
Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lins.
Photographing Cacti	A.W.Craig, 16 Skeeby Close, Harburn, Stockton on Tees, Teesside, TS18 5LY.
Sulcorebutia	W.G.Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs.
Trichocereus	N.T.Hann, 5 Lake Road, Shirley, Croydon, Surrey, CR0 8DS.

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