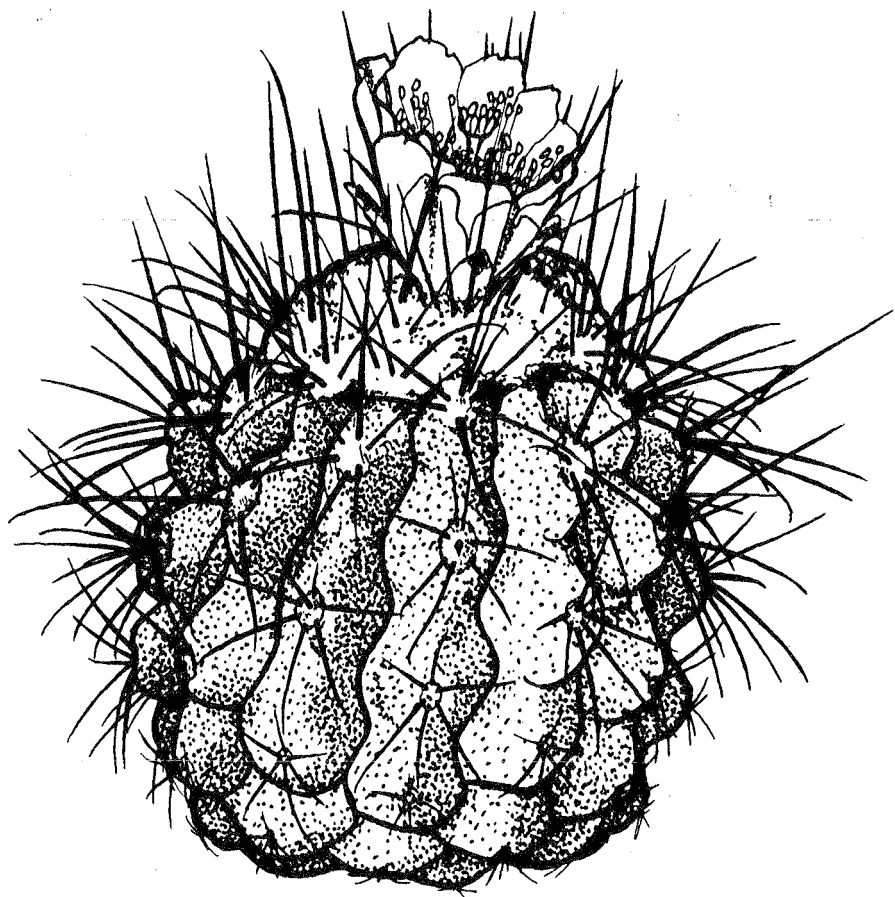


THE CHILEANS '69

VOLUME 3 NUMBER 15



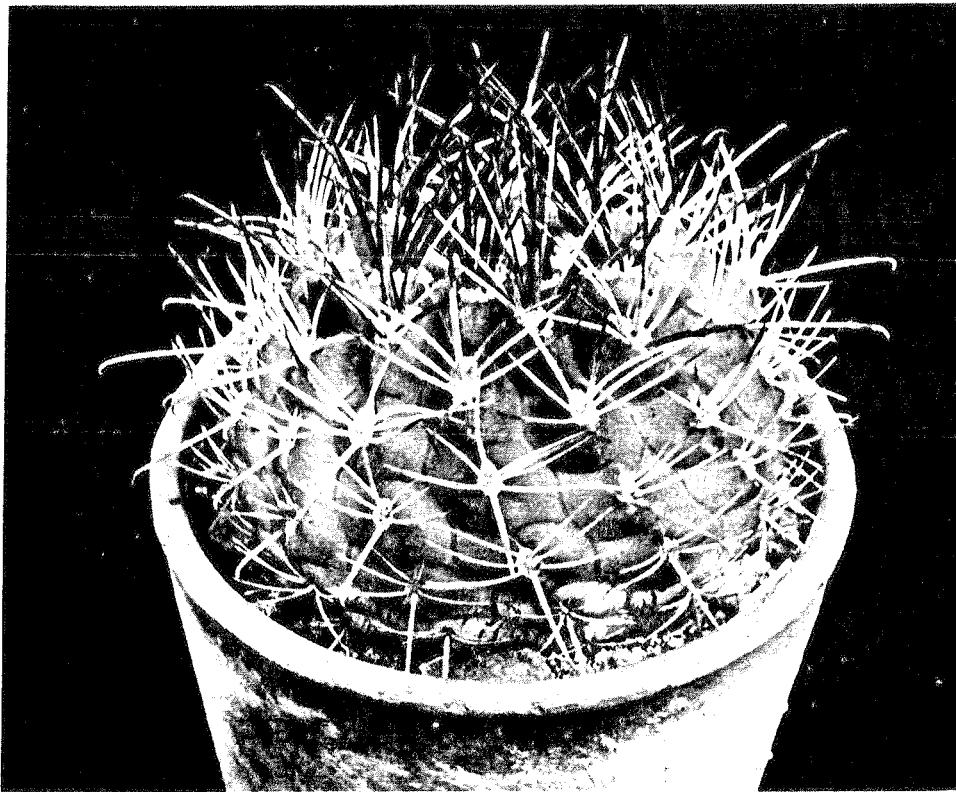
COPIAPOA

MONTANA

actual size

Collection: C. Lazzari

CARL J. LAZZARI



NEOWERDERMANNIA CHILENSIS Backbg.

By R. Ginns

I read the article on the Chilean 'earth cacti' (Chilean No. 12 pp 92-4, No.13 pp. 151-3) with considerable interest although the term was new to me. Having grown most Copiapoas, Chileorebutias and Neochilenias from seed I had noticed the presence of well developed tap roots in most species of these genera and some years ago pointed out in the N.C. & S.S. Journal that this was a characteristic of most Copiapoas, contradicting a correspondent who thought that the majority only had fibrous roots. He had evidently been dealing with mutilated collected plants or else those taken off grafts and rerooted.

The point of most interest concerns the withdrawal of the shoot into the ground during spells of drought. This is caused by the shrinking of the tap-root, a process which can also be observed in some species of crocus which pull the corm to a suitable distance below the surface. I have only found this phenomenon to occur with young plants and not, in fact, with Copiapoas; but plants up to two or three years old of all the Chileorebutias and some of the Neochilenias need repotting in the spring to bring the bodies above soil level. In extreme cases the plant disappears altogether underground. Those who graft their seedlings miss this interesting characteristic. The habit can also be observed in some of the Fratleas (Chileans No.13 p.154) and Gymnocalyciums from the other side of the Andes.

A notable omission from Herr Weisser's list of species was the two species of Neowerdermannia, chilensis and vorwerkii. I grew both species from seed collected by Herr Ritter but the latter failed to emerge from its second winter underground. N. chilensis buried itself completely for a year or two but this was not possible when it grew larger as, although grown in a 'long tom' the tap root completely filled the pot. It has developed into a handsome plant but neither the plant body, buds or flowers justify placing it in the Gymnocalyciums as some of the "lumpers" wish to do.

The chins on the tubercles characteristic of the *Gymnocalycium*s are absent and the strong, mahogany coloured central spines are slightly hooked. Most of the plant is below ground so that the diameter is more than twice the apparent height. The flowers are small and insignificant compared with the *Gymnocalycium*s, off-white in colour.

Backeberg in "Die Cactaceae" gives two photos of flowering plants, one of which has far larger flowers than the other so perhaps I am unfortunate in my specimen. It is strange that this interesting plant is not more often seen in collections, and stranger still that most judges appear to be quite ignorant about it.

Comments from J.D. Donald

Much of what Ron Ginns has to say about this plant is of interest, but it may be as well to make clear that it is not the tap root that shrinks, but that part of the plant body which is above ground, which is gradually dehydrated from its fully turgid state in the growing season, by withdrawal of moisture to the fully protected storage system or stem below ground - which is strictly not a tap root in this plant. These parts below ground do not shrink, unless conditions are so bad that dehydration occurs by transpiration exceeding the normal intake during the resting period. The shrinkage of the body above ground is an aid to reducing excessive transpiration and the loss of valuable moisture.

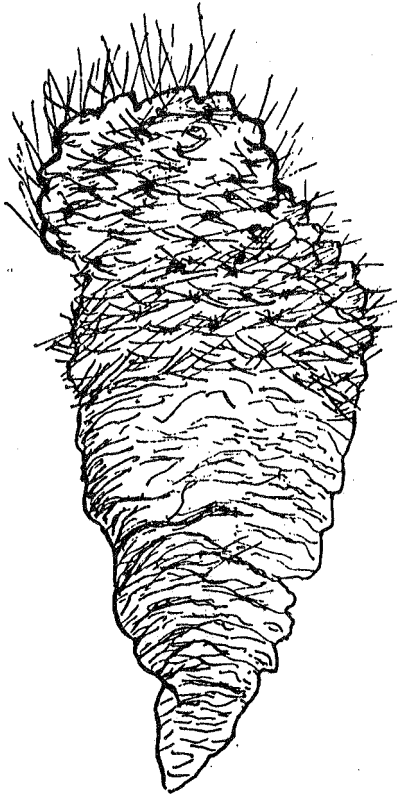
To appreciate what is and what is not a tap root, it is necessary to realise the technical distinction between an underground stem and a root. Now a tap root is a root and not a stem, and while a stem can grow new roots, a root cannot regenerate a stem. In the case of most cacti the portion below ground - the "fully protected storage system" referred to above - is a stem and quite capable, if its head is removed, of growing a new head. The roots in this case are often the adventitious fibrous attachments to the underground stem or else the tapering terminal descenders from the underground stem, these latter being true roots. These true roots do not regenerate the stem if severed and, if swollen and acting as a water storage organ, are the true tap roots. A swollen root is thus only a tap root if it is a true root in the sense of regeneration.

The tuber forming cacti are indeed of two basic types - there is firstly the swollen root type e.g. *Wilcoxia* spp., *Weingartia neumanniana*, *Peniocereus* spp., *Parodia* spp., all of which do not regenerate stems if severed; and secondly there are the underground stem types that can make new plants and roots from the swollen tubers e.g. *Notocactus caespitosus*, *rechensis*, *N. ottonis*, *Pterocactus* spp., *Austrocactus* spp., *Gymnocalycium* spp. e.g. *uruguayense*. The former may be correctly described as tap rooted but the latter cannot technically be correctly so described.

There are very many genera which have species that shrink in adverse conditions and possess a thickened underground portion - such as in *Lobivia*, *Rebutia*, *Sulcorebutia*, *Weingartia*, *Wigginsia*, *Frailea*, *Lophophora*, *Toumeyia*, *Ariocarpus* and even some *Mammillaria* - which behave similarly to the *Theloccephala* (*Chileorebutia*) and the *Nichelia* (*Neochilenia*) discussed by Herr Weissner in the article referred to by Ron Ginns. *Neowerdermannia* is yet another name to be added to this list.

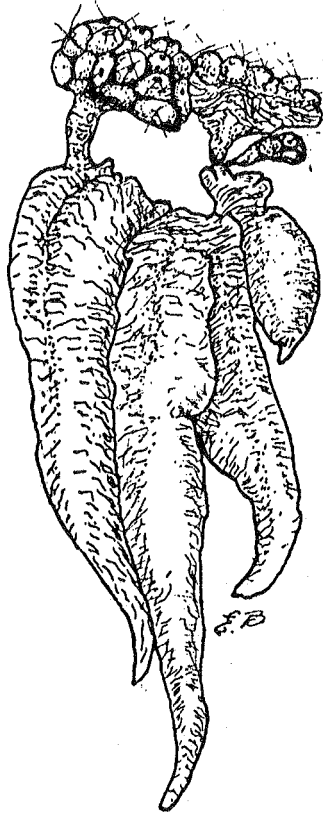
This genus of *Neowerdermannia* has possibly three species, very variable amongst themselves according to body size, length of spines, type of spine - straight or hooked - and a very wide distribution, even if somewhat scattered, covering southern Bolivia, Northwestern Argentina, southern Peru and northern Chile (see cover map Chileans No 13 - H.M.)

The rarest species is undoubtedly the interesting plant from Iquique in Chile, FR 199 or *Neowerdermannia chilensis* sensu Ritter non Backeberg, with its straw yellow flowers as opposed to the pinkish flowers of *N. vorwerkii* and *N. peruviana*. The straw coloured flower of this Chilean plant is typical of many of the plants from this region e.g. *Islaya*, *Chileorebutia*. Ritter



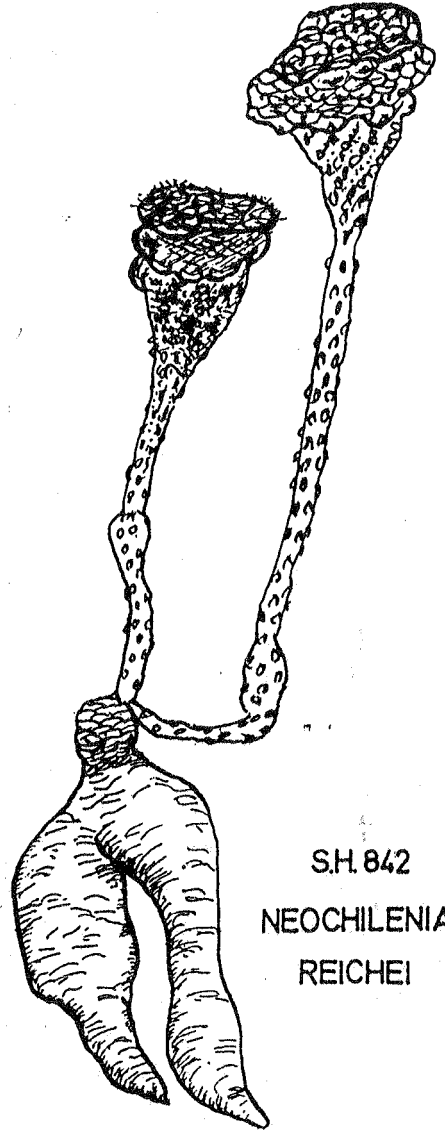
S.H. 807

NEOCHILENIA RESIDUA



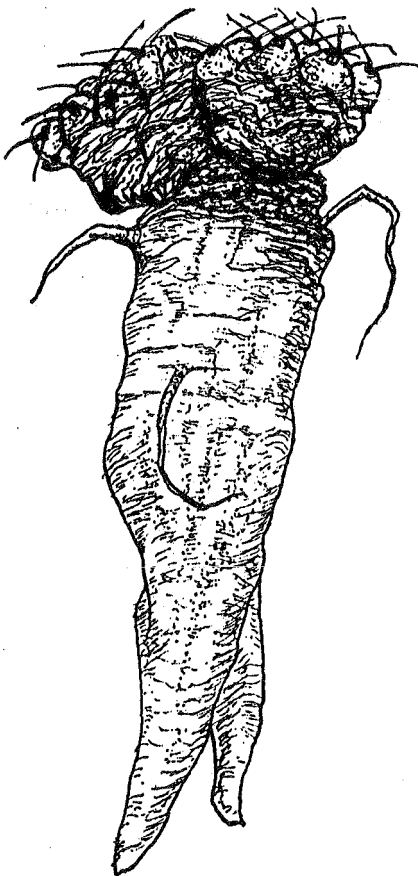
S.H. 810

COPIAPOA HUMILIS



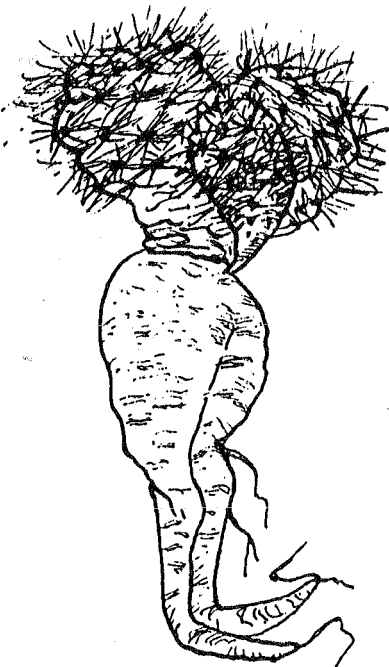
S.H. 842

NEOCHILENIA
REICHEI



SH. 839

NEOCHILENIA TRAPICHENSIS



S.H. 844

NEOPORTERIA
VILLOSA



S.H. 835

NEOCHILENIA
NAPINA

Imported plants with swollen roots - or buried bodies. All actual size. Collection E.W. Barnes.

distributed FR 199 both as seed and as mature plants under the name *Neowerdermannia chilensis*; some plants almost identical have been distributed as *Horridocactus iquiquensis*. That this plant is a true *Neowerdermannia* may be questioned - it has not yet received a very thorough study, particularly as regards seed and flower structure. The flower does certainly resemble *Neowerdermannia vorwerkii* upon a superficial glance - apart from colour - it is very short tubed but it is less buried in the areole than that of *N. vorwerkii*. The tube scales are fairly broad and are naked, to all external observations.

The true *Neowerdermannia chilensis* as described by Backeberg is clearly a close relative of *N. vorwerkii*, (much nearer than FR 199) and is found near Ticnamar on the Chilean/Bolivian border. Probably the former together with *N. peruviana* constitute a single widely distributed species.

The forms of *N. vorwerkii* such as var. *erectispina* of Hoffmann and Backeberg, collected near Viacha by La Paz in Bolivia, are very similar to plants collected by Albert Buining recently above Torata in Moquegua, Peru; similar plants from the same area were also collected and distributed by Alfred Lau. Ritter's *N. peruviana* (FR 191) seems to be rather shorter spined than the Torata plant and was found nearer the Chilean/Peruvian border.

Neowerdermannia vorwerkii was first described by Fric in 1930 in the Czech Journal *Kaktusar* 11: i, 85-87; he discovered the plants in the early nineteen twenties.

Comments from E.W. Barnes

I also found the notes on this plant of interest and from my own observations of a fairly large number of collected Chilean cacti I recently received from D.W. Sargent I would agree that a well developed tap root is a feature of many of these plants. *Copiapoa humilis* in particular seem to possess large tap roots - in many examples these are branched. The plant bodies are quite often attached to the root system by a thin neck which in some examples reached 10 cm in length. With some species this neck is a constant characteristic whilst in others it occurs sporadically. I imagine that some of these necks may be the length they are because they act as runners and probe their way to the surface between the unyielding rocks.

Many of these plants seem to withdraw into the ground by means of shrinkage of the plant body, which folds up like a concertina during the resting season. It appears to me that the majority of these species would find it difficult to withdraw their bodies into the ground by shrinkage of the tap root, as they seem to have been growing between rocks etc. to judge from the misshapen roots and stems. The bodies are so tenuously attached to the root system by the neck that any contraction of the rubberous root would probably sever the plant body from its roots.

Comments from H. Middleditch

Swollen subterranean parts of a plant seem to make more impact upon a collector when their aerial parts (i.e. those parts above ground level) are so easy to distinguish. Three plants in my own collection come to mind immediately - a *Wilcoxia*, a *Pterocactus*, and *Opuntia clavarioides*. The two former have long, thin aerial parts in sharp contrast with the carrot-like tuber which may be bifurcated or trifurcated with several descenders. My *Pterocactus* tuber was about 9 cms long and 4 cms dia. when acquired, complete with a solitary and short growing limb; this was unfortunately broken off in transit, thus leaving me with only the tuber to plant. In due course, this part produced further stems which, by John Donald's definition, makes it an underground stem and not a root. I suppose that we might call it a caudiciform cactus; next time I find a class in a Show for caudiciform succulents I must try entering my *Pterocactus* in it.

The underground parts of these plants (isn't it awkward not to be able to be simple and just say 'roots'?) are rather carrot like in shape. I would have tended to describe this as rapiform, but I am unable to find this term either in Marshall and Woods 'Glossary of Succulent Plant Terms' or in my dictionary and wonder if I am entitled to coin this description myself. The tuber

of *Opuntia clavaroides*, on the other hand, has a more spreading habit in my experience, with many more points, somewhat like a peony tuber.

The thickened roots on my plants of *Mammillaria picta* and *plumosa* are not as obvious at first glance as those in the foregoing group since they carry an even broader body, whereas the thickened rootstock on *Sulcorebutia canigueralii* tends to be more obvious in comparison with the relatively small body.

I have observed a further phenomenon which seems to be related to John Donald's comments regarding what is a tap root and what is a buried stem; during our 1969 Continental Cactus Tour I acquired a *Notocactus megapotamicus*, apparently carrying two small offsets at the base. However, when this was being potted up and the adhering soil was removed, it became evident that the two offsets were not carried on the plant body but arose from roots - these being the whitish roots about one mm thick fairly typical of a number of *Notocacti*. Now I wonder whether we are still entitled to call this, too, a root?

I am inclined to think that Eddie Barnes plant (SH 810 on his sketch), has had the head broken off or chewed off by a foraging animal at some time and has grown two fresh heads. I am also wondering if SH 807 has originally had a small head above ground, which has been buried by sand and gravel brought down by a sudden, brief, flood of water - and has then had to push two slim heads up to the surface through the covering mantle.

NEOWARDERMANNIAS - TREASURES FROM THE ANDES by Gerhart Frank

(Translated by E.W. Bentley from *K.u.a.S.*, Vol. 12, No. 2, February 1961)

Just as with the striking picture of *Copiapoa cinerea* in Backeberg's Jubilee Catalogue, 1937, so was I taken with that of *Neowerdermannia vorweckii*, that I had already seen for the first time in the B.f.K. 1935. A genus that comprises only one or two species had anyway to me become somewhat unusual, but above all was this remarkable plant, in which the spine cushion lies buried in the body between the prominent chin-like protuberances. It looks as if the areoles have slipped from the tip of the tubercles down into the axillae. This unusual arrangement occurs only in a few species in the whole cactus family and I therefore wished all the more to possess this 'outsider'. But I had to exercise much patience before I came into possession of my first specimen of a *Neowerdermannia*. To my knowledge here in Austria before the war no collector had a *Neowerdermannia* in his collection and I believe it was even rare in Europe and thus was scarcely to be obtained from the trade.

The opportunity to collect this, my old but platonic love I certainly had in 1954, when I travelled on the Andes Railway from La Paz, the capital of Bolivia, over the desolate stony high plateau between Oruro and Potosi. I looked out, glued to the window, as I recalled that the literature magnanimously gives this whole area and still further on south as far as N. Argentina as the discovery place. But where should one start looking?

It would be just as if a South American orchid collector looking for our lady's slipper and with the habitat data in half-shaded edges of woods between Vienna and Paris looks thoughtfully from the Vienna-Paris Express and wonders where he should get down and collect.

Unfortunately almost all early cactus descriptions are provided with such exceptionally wide-ranging habitat data which often makes the search for a particular plant especially difficult. Commendable exceptions are shown by the two eminent Latin-American cactus botanists, Dr. Helia Bravo from Mexico and Prof. Dr. M. Cardenas from Bolivia, accompanying whose descriptions are the exact distribution range of the habitat of the type, so that a species described by them can definitely be re-collected.

Now back to the point. I have to thank Prof. Cardenas for my first *Neowerdermannias* for then, through lack of time, I did not manage to search for it at all in the wide distribution area.

Prof. Cardenas knew an occurrence place near Oruro and wrote to a friend there. Several years later, in the summer of 1957, I received a package with four Neowerdermannia vorwerckii, and you can imagine my surprise and delight in unpacking them after waiting so many years.

After the long ship voyage the thick tap-rooted, somewhat shrivelled N. vorwerckii quickly rooted themselves in a loam-sand substrate with an acid pH value. Even in the first winter I did a somewhat daring experiment. I knew that the occurrence place at Oruro at a height of 3500m has a very tough climate with winter frosts. So I left two N. vorwerckii with some winter-hard 'colleagues' from the U.S.A. in the open air in front of my house - although protected from the rain by a far-out projecting roof - and over-wintered both the others with the rest of the collection in the 'lower plus-degrees' (i.e. a few degrees above 0°C - E.W.B.). The two in the open air survived a couple of frost periods, one of which for about a week held a temperature throughout of about -12°C and further, they were snowed in for some ten days after a snowstorm. As thanks for this rough handling, which they were obviously used to, they flowered in the spring, while the two over-wintered warmer did nothing. Since then I have left all my N. vorwerckii in the open, for which they have now thanked me for the third spring running with flowers.

A year ago, this time through the Viennese collector Hans Borth, I received some Neowerdermannias that he had found near Humahuaca in N. Argentina. Externally they differ only unimportantly from their Bolivian cousins, but flower violet-pink, while the latter have pure white flowers. On the basis of the flower colour these Argentinians were classified by Backeberg as the variety "gielsdorfiana".

Characteristic are the developing buds that at first look like sharp black tufts of feathers and break out above the older areoles of the crown. On the deep-lying and therefore invisible ovaries sit the naked-tubed, short, externally blackish-green flower tubes which last 2-3 days and smell very sweetly. The comparatively thick-fleshed fruit lies deep down between the wide projecting chin-humps and at ripening tears open, cap-like above. Contrary to the literature (Backbg. B.f.K. 1935 - 1) "fruit with some few seeds", I observed in all the fruits of my plants, that they contained 25-35 seeds. The oval seeds are up to 2 mm long and have the wrinkled matt appearance of chocolate truffles.

N. vorwerckii was discovered by Fric who described it in 1930 in the Czech journal "Kaktusar". Backeberg in Vol.3 of his "Cactaceae" claimed that Fric's genus diagnosis was based on characters that really didn't exist and thus the genus Neowerdermannia was in no wise justified. They are Fric's merely conjectured hairy flower tube (apparently Fric saw only small buds which from superficial observation would permit this conclusion) and secondly the endogenous development of the fruit. In reality, however, the flowers are naked-tubed with bare scales. The fruits sit rather deep down between the wide projecting chin-tubercles, scarcely visible in shrivelled plants in habitat which, however, can certainly not be described as arising endogenously. Backeberg finally suggested that Neowerdermannia could eventually be brought under Weingartia. Donald also, in an article on the genus Weingartia, indicated its near relationship to Neowerdermannia. The labours of the American Hutchison, who merged the genus Weingartia in Gymnocalycium are interesting in this connection.

In 1936 Backeberg added to the originally monotypic genus Neowerdermannia a species newly found by him that he described as N. chilensis. In habitat, however, this species shows few resemblances to N. vorwerckii, particularly in that the spine cluster lies on the tips of the tubercles and not in the depths between. Also the spherical green buds distinguish the species from the foregoing and lend it rather more the appearance of a Weingartia. Conspicuous in N. chilensis is the beautifully coloured spination with the mostly dark, long, hooked middle spines.

In 1955 there appeared in H. Winter's Seed Catalogue II under the collector's number FR 191 a species newly found by Ritter under the name Neowerdermannia peruviana. This new plant, as the name indicates, comes from Peru, and according to Ritter's data was actually collected by him at a height of 4000 m in the Dept. of Tacna. N. peruviana which is unfortun-

ately not known to me, has a certain resemblance to N. chilensis but is smaller in growth and is harder spined. However Ritter seems to have found only a few specimens of it for seeds of this species were unfortunately only offered twice. N. chilensis on the other hand is available under the name FR 199 and grows well and easily from seed. Also fine imported plants of it were offered by Frau Winter who wrote me that they flower easily in the spring with a light, cool overwintering. Unfortunately I do not yet know the flowers myself. They should, like N. vorwerckii appear in a ring, but be yellow.

From our knowledge of the habitats, the small genus Neowerdermannia with its so far only three known species, has an exceptionally wide distribution range. It is therefore reasonable to suppose that other unknown Neowerdermannia species are to be found in the still unexplored areas of the distribution zone.

IN SEARCH OF MALACOCARPUS STEGMANNII by D.J. Van Vliet.

(Translation from Succulenta, July 1968 by W.W. Atkinson)

A study of maps of the area where *Malacocarpus stegmannii* was supposed to grow, produced one fact beyond doubt; in the whole district, known locally as Pampa Grande, was only one important town, Puelches by name. On these maps, purchasable from the Military Geographical Service, this Puelches was marked with a circle round a dot, which means 'provincial capital'. And so with every confidence I took the bus that evening from Chelforo to Puelches, arriving at 1 a.m.

I was astonished to see only one building - the bar which the bus used as its staging point. Desperately, I asked the driver if this was actually Puelches. The answer was in the affirmative. The place seemed to fulfil several functions for it was also restaurant and hotel. Behind the pumps sat enthroned a thin-as-a-rail landlord with a face looking as though he had just completed 20 years hard labour. His mood was in complete agreement with this diagnosis. "Give me your passport" he snarled. So I snarled back at him that I would go and sleep outside. He looked at me with watery eyes and in a much milder tone remarked that it was much too cold to sleep outside. "That might well be" I said, "but if the Argentines are so unfriendly and have no understanding for their guests, then anything is better than to stay with them".

This proven gambit worked immediately. It was unfair to suggest that Argentines weren't hospitable. After a bit of conversation we quickly became the best of friends, and before he went to bed the amigo must first sample his best wine...

However, let me know get down to the cactus part.

The next morning - and how soundly you sleep after all that travel and walking - the sun had long been up when the host of last evening knocked on the room door to rouse me, adding that breakfast wasn't so early but that it was now high time to partake of it. I was quickly ready. There was no water, so that saved time washing. Diffidently I enquired of the landlord how one went about bathing here. "Bathing" he repeated, astonished, "but that's a waste of drinking water". Something of a contrast with our water problems in Holland.

After filling the water flask and buying two packets of biscuits at the grocers shop, which, incidentally, was also run by the landlord in addition to the posts of telegraphist, postman and mayor, I went out to have a look at the "capital". That was soon done. Although in the darkness of the previous night I had not seen all the "buildings", there weren't in fact more than eight, plus the school. Argentina does a lot for education, especially in remote parts. She builds schools and supplies teaching staff who receive an extra allowance here.

If the information on the map was not altogether in accord with reality, the difference was yet greater when I sought in vain for "Serra Gould" near by. Back to the landlord for directions, who said "the provincial capital notation is correct, but that hill bit is quite wrong".

Still, I was here, and so set off into the countryside. Only tiny hillocks marked the place where the military geographer had allocated a mountain range. After several hours walking about I had actually found 5 *Gymno. ferox* var. *nigra*. They were smaller and finer than those I had found the day before near Chelforo. These habitats are about 150 km. apart, far enough to warrant minor differences of form. But you can never be quite certain on such matters, and now there was not a single *Echinopsis rhodantha* to be found.

While I was cleaning the plants, I wondered why so often, and here too, the plants grow under bushes. Was it on account of the shade? No, I don't think so. Was it perhaps so that they wouldn't be noticed by grazing cattle? I think also not. Taking into account the soil in this region, which contains a great deal of chalk and salt, I decided that cacti growing very near to other plants take advantage of the layer of humus produced by leaf fall. In places such as between rock formations of harder stone, cacti are growing everywhere. Here the chalk and salt are missing. But, as I said, one should be careful about these remarks although it agrees with my experiences in the greenhouse where the plants also grow very well in a compost rich in humus.

After these reflections I went back to the landlord/mayor who, in accordance with local custom here, set a splendid meal before me and after this I set off for the Serra Lihuel-Calel.

I had seen this hilly area in the morning, but as the wind grew stronger it began to disappear from sight because of the wind-borne dust that hung in the air like a smokescreen. After paying the bill for bed, breakfast and lunch with wine and soda, a total of 10/-, and a hearty farewell from the landlord, I tried my luck with a lift towards the Serra Lihuel-Calel. It was already past four, and I began to wonder why a road had been made here at all, when a dustcloud announced that a motor vehicle was approaching. It stopped at my signal and took me the 33 km. to the Serra Lihuel-Calel. At the foot of it the Argentinian Automobile Club has built a motel which served as base-camp for the following days. These motels offer a very good service and are examples of the splendid work that this club does for its country. After the evening meal, (the bread left over becomes one's breakfast the next morning so saving money), I had my washing to do and dived into bed with anticipations of the first *Malacocarpus* on the morrow.

The Pampa was bathed in clear sunshine that morning and it looked like being a fine day. Later in the day the wind got up again and the dust clouds with it. The many salt-water lakes in the area give off enormous salt-clouds. One can taste the salt on the lips. The Lihuel-Calel hills are about 5 km long with several side arms. The highest peak is 400 m. I intended that day to walk along the sunny side and back on the shady side. After the first few metres climbing I was very surprised to find *Notocactus pampeanus* which is smaller in diameter here than in the mountains near Cordoba. The white spines made a good subject for the camera. It was not long before I found *Malacocarpus stegmannii* and countless *Trichocereus candicans* with every colour of spines. Also growing here was a *Gymnocalycium* which I could not name, but it resembles *G. ferox* var. *nigra* which is very common in this countryside. However, this plant was much smaller and the spines weaker and it had a long turnip-like root.

Talking of turnip-like roots, I also found a *cereus*, the name of which I likewise don't know - after all I'm no Backeberg - consisting of 3 separate stems of about 4", with black spines and a blue body. I thought they were seedlings and tried to dig them up, but they remained firmly anchored in the ground. In the whole district I had never seen this plant before and it was at the end of the trip when I did find it, so I hacked merrily on, and there appeared two roots, each a foot long and a top diameter of 4", just like a sugar beet. This I had never seen and so this plant soon disappeared in the collecting bag. As I said, I had seen no other specimens of this plant and was to find no other. I thought it was probably a dead-ordinary plant, but unusual growth forms are worth taking away.

So I found *Malacocarpus stegmannii*, dichotomously split into 6 heads, and moreover, a cristate form of the same species which had grown in a complete circle to look like a normal form. Unfortunately I could not find a cristate *N. pampeanus*. In this area are many *Opuntia*

tunicata and their orange coloured fruit remains contrast splendidly with the thick, light-yellow spination. Naturally I took photos of these. With all these occupations, the day came all too soon to an end and a hairy bird-hunting spider on his way to his hiding place gave me a good tip that it was time to do the same.

In the course of the day I had acquired a fair load of plants to carry back. At the motel I got two large cartons in which to pack the plants and prepare them for transport. The following day I must go back to General Roca to have the boxes sent to Buenos Aires as one cannot travel about with such impedimenta. In Buenos Aires I shall later collect them from the depot for despatch to Europe. It hardly needs to be said that all this packing was of great interest to the Argentinians who simply couldn't understand why anybody could get so excited about such weeds.

On the programme for the following days were several "Serras" in the direction of Bahia-Blanca. It is to be hoped that the maps give better information than previously, but in any event this enormous Pampa offers something different at every turn.

WIGGINSIA - OR MALACOCARPUS ?

Comments from J.D.Donald upon Notes on this genus in Chileans No.13 pp. 128 - 129...

While the name Malacocarpus S.D. is well known and respected amongst the cactus loving fraternity it is nevertheless an illegitimate name under the rules of the International Code for Botanic Nomenclature (ICBN). The name Malacocarpus was first proposed by Fischer and Meyer in 1843 of the Rutaceae, a fact presumably unknown to Salm-Dyck when he used the name in 1849 (Malacocarpus S.D. cact.hort. Dyck cult. 1849, 24:1850) to distinguish this familiar group of cacti from the comprehensive genus Echinocactus of Link to which most globular cacti of that age were referred.

Although the name Malacocarpus has never been adopted seriously in the Rutaceae, it was nevertheless the first proper use of the name and hence cannot be used again for a completely separate group of plants. Malacocarpus S.D. is an illegitimate homonym of Malacocarpus Fisch & Mey despite the familiarity which the former enjoys. In 1955 R.S. Byles proposed conservation of Malacocarpus S.D. over Malacocarpus Fisch. & Mey. on the basis of the familiarity and the non-adoption of the name amongst the Rutaceae, but the I.C.B.N. Congress of that year rejected the proposal. A new name for Malacocarpus was therefore necessary if the generic status of this group was to be maintained and thus D.M. Porter in the United States proposed the name Wigginsia in honour of Professor Ira Wiggins, a leading authority of the American cactus flora - Wigginsia D.M. Port.

This, of course, begs the question - is a new name really necessary? Do these plants warrant generic status? Current opinion tends towards consolidation rather than splitting of botanical genera, and the very close relationship of Wigginsia with Notocactus suggests that Wigginsia might be better treated as a section of an enhanced Notocactus genus rather than as a separate entity - and so the Krainz-Buxbaum proposal to place these plants in Notocactus finds considerable favour and support amongst most leading botanical authorities. It is to be hoped that the cactus loving fraternity will see the wisdom of this and follow suit.

Now to the plants themselves. Walter Rausch has observed the tremendous variation of these plants in the wild and made the bold suggestion that fifteen names could be reduced to one. Like Ken Halstead I believe Rausch is probably not far from the truth. My own observations of the plants in cultivation (mostly on collected plants) confirms this. Rausch is referring predominantly to the tephracanthus complex, which is widespread in distribution throughout Uruguay. The plants in this group are easily recognised by their very deep acute ribs, with areoles fairly widely separated, yellow or horn coloured spines usually flattened and often adpressed, and bright green epidermis. They are large growing relatively flat plants and the crowns do not develop to such an extent the thick wool characteristic of the other groups of Wigginsia.

In this group belong the following species: W. tephracantha, fricii, sellowii, pauciareolata, sessiliflora, and its variety martinii, macrocantha, macrogonia, ernestii, tetracantha, and courantii. All could without much difficulty be considered members of a single species, the only variations really observable between them being number of ribs, number and length of spines, presence or absence of central spines, size of flower, none of which are characters of sufficient import to justify specific separation.

Another large group is centred on W. erinacea; these are generally darker in colour than the tephracantha group, bear much more wool in the crown, more numerous but less acute and shallower ribs, white or pale yellow rounded and more outstanding spines, and include W. erinacea, corynodes,

leucocarpa, langsдорffii, stegmannii, vorwerkiana, and kovaricii, in my experience. Again there is little that is specifically distinct to justify separate specific status for each, except that vorwerkiana is unique in its alleged Colombian habitat and stegmannii in its isolation on the Sierra Lihuel Calel in north Argentina and its tiny flower.

As Rausch has found, W. arechavaletai is quite a distinct and separate plant with its characteristic black spines and its stiff, strong, central and the very local distribution around Maldonado.

The other Wigginsia species are largely found in Southern Brazil and each are very distinct plants. W. horstii and its variety juvenaliformis, longispina, prolifera - the only really offsetting Wigginsia, leprosoia with its very dense woolly crown, all very readily distinguishable from the tephracantha and erinaceus groups and from themselves individually.

At present we have only three slides of Malacocarpus (Wigginsia) in our Slide Library and any additions would be welcome - A.W.C.

DOES "FRAILEA PULCHERRIMA" ARECH. EXIST? by V. Hrabě, Czechoslovakia.
(Translated from 'Succulenta' for July 1968 by H. Middleditch).

After undertaking a search for plants of the genus Frailea in our collections and in those in other countries, I have established that some species are not difficult to find, except that the plants observed did not agree with the original description.

Alas! these descriptions were very incomplete, so that people on the whole regard another plant as the species originally described.

Thus I have searched until now, without success, for Frailea knippeliana, Frailea pygmaea v. aurea and other species.

As for these other species, there is also F. pulcherrima Arech. which was described in the year 1905 by Arechavaleta. The description - in general a very good one - was supplemented by a photograph which was included amongst others by Britton and Rose in their extensive publication.

The plant is about 30 - 40 mm tall, having a diameter of 15 - 20 mm, 19 - 21 ribs and having a strong tap root; 10 - 12 whitish radial spines which are 1 - 2 mm long, spread round the slightly sunken areoles like the feet of a centipede. The sulphur-yellow flower, which is about 12 - 20 mm long, reaches a diameter of 25 - 30 mm. The flower tube and the stamens are bright yellow. The fruit is covered with woolly hairs, and with numerous sulphur-yellow spines. The author did not record the outward appearance of the seeds.

I have sought after this one plant, sown seeds offered in seed catalogues, written after them outside the country, all for nothing. All the plants which I have received up until now have belonged to F. schilinzkyana, here and there with a whitish spination, but so far the genuine Frailea pulcherrima has not appeared.

The photograph by Arechavaleta approximates more to the species Frailea pygmaea v. phaeodisca Speg. Yet I doubt if there is really a resemblance. A short while ago I acquired a book by C. Oosten (1941), wherein this collaborator of Arechavaleta stated that F. pulcherrima Arech. was a synonym for F. pygmaea v. phaeodisca Speg. and that he had seen the original plant in the herbarium of the museum of Montevideo.

Spegazzini had described F. pygmaea v. phaeodisca as a variety of F. pulcherrima in 1905. However, in the two descriptions shortly following each other he described the plant differently.

Arechavaleta in his book described F. pygmaea v. phaeodisca as F. pygmaea and omits the additional variety phaeodisca completely.

C. Oosten wrote that the plant which was photographed by Arechavaleta and described as F. pulcherrima Arech. could be a fast growing form of F. pygmaea v. phaeodisca.

I am completely in agreement with C. Oosten that the photographs and description in both works proves this. It is also hardly credible that such a striking and large flowering Frailea should only be found on one occasion.

It is of interest that C. Backeberg had not noticed this and described F. pulcherrima as such in his 'Cactaceae' 1959 and at the same time included in his book a reference to the works of C. Oosten in the descriptions of Malacocarpus and Notocactus.

In the book by A. Berger, 'Cacteen' 1929, the spination of F. pulcherrima was given as

light brown and this description was adopted later by Backeberg and Knuth in 'Cactus ABC' 1935. Both descriptions do not agree with the statements of Arechavaleta.

The possibility exists that herein lies the original of all confusion between *F. pulcherrima* Arech. and *F. schilinzkyana* Haage jr. and possibly between the plants which we have so far called *Frailea pseudograhiana*. (*F. pseudograhiana* differs from *Frailea schilinzkyana* by a lighter spination and less felt on the areoles).

All plants which occur in sales lists and in collections as *F. pulcherrima* must then also be considered as *F. schilinzkyana* or a variety of this species.

Since *F. pulcherrima* has not appeared, except only as a synonym of *F. pygmaea* v. *phaeodisca*, we must seek further for the genuine *F. pulcherrima*. Additionally the question remains open, as to which plant Ir. Cervinca has described in 'Kaktusarky Linky' 1949. From outward appearance, the plant strongly suggests *F. schilinzkyana*; in the description of the seeds Ir. Cervinca differs radically. The seeds of *F. schilinzkyana* are normally dark brown to black. Cervinca described the seeds of his *F. pulcherrima* as chestnut brown. Still, this case might lead us again to a new problem, so let us keep to the original one.

WHAT'S NEW IN THE WORLD OF CACTI

A talk given to the Upper Austria Branch of the G.O.K. in February 1965 by Dr. A. Simo. (Translated from the G.O.K. Newsletter by W. Kuegler).

Dr. Simo began with a slide of *Matucana hystrix* from the Botanical gardens of the University of Heidelberg, which had the impressive height of 60 cm and exhibited the up to now unknown habit of an old plant of this species. Pictures of plants from this genus were recalled in our memory to recapitulate the characteristic features of *Matucana*: the zygomorphic flower with a completely naked flower tube, (this characteristic has, by some authors, not been pointed out with enough significance), and the peculiar fruit, which bursts open longitudinally in 3 - 4 segments.

The genus *Matucana* is found in Peru and has two localities, a northern and a southern. *M. hystrix* can be found at over 4,000 m (12,500 ft) altitude on rocky slopes and cliffs where it is very hot by day but pretty cool at night. During the flowering season the plants are subjected to nightly temperatures down to minus 2°C. These extreme fluctuations in temperature in habitat make it understandable that plants in our cultivation cannot match the magnificent spination of imported plants.

M. hystrix inhabits the westerly (Pacific) flank of the Cordilleras, whilst on the eastern flank, at over 3,000 m (app. 9,500 ft) occurs the clustering *Matucana multicolor*, which is particularly distinguished by its colourful spination. It is probably that *M. hystrix* and *M. multicolor* are not two different species, but more or less distinguishable different varieties.

In Heidelberg Dr. Simo found a plant which had been collected by Werner Hoffmann on the Rio Fortaleza (see map on front cover on Chileans No. 8 - H.M.) which was recognised and described by Backeberg as *Matucana blankii*. His description is rather paltry; among other things, he states "Radial spines silvery white, central spines hardly distinct". The first is correct - the latter, however, is not. *M. blankii* comes from the northern locality. In the Linz Botanical Gardens there is a plant collected by F. Ritter which was named as *M. blankii* - though not without some doubts. But in the last few years the doubts have been dispelled through stronger development of the central spines. The cup-shaped arrangement of the upper radial spines is the characteristic of this species - which never seems to have been mentioned in literature. A clear identification of seedling plants is indeed difficult; however, an accurate diagnosis is possible when the plant reaches a more mature state.

A further colour slide brought to us *Islaya bicolor*, a plant also cultivated in Heidelberg, described by Ackers & Buining. In this species there are 2 to 4 central spines standing one behind the other.

The genus *Islaya* occurs in southern Peru; only one species spreads southwards into north Chile. Its homeland stretches from the immediate coast up into the Cordillera in a desert consisting of stones and sand, where no rain falls for years but where thick fog prevails for three to four months of the year. Characteristic of all *Islayas* is the fruit which is small at first, extending very greatly into a club shape before ripening, very hairy externally and hollow inside. Imported plants grow as large a fruit in cultivation here as in habitat. Imported plants do not change their habit in cultivation, but will tolerate more watering without damage; cultivation is not difficult, provided that the imported plants are healthy.

At Uhlig's nursery in Rommelhausen, we found among a large batch of imported *Islaya* bicolor, two plants which were of a different habit. One plant with strong black spines in the crown could possibly be *Islaya* minor. The other plant (found at Calla in Chile), with a strongly spined crown covered with a strikingly large cushion of wool, may possibly be a new species.

Dr. Simo then turned to the formation of cephalia. He referred to cross-sections through the cephalium of *Melocactus* and *Discocactus* and reminded us that after the cephalium is formed, *Melocactus* will stop growing in size whilst on the other hand *Discocactus* will continue to grow and still gain in volume.

In addition to those plants forming a cephalium at the crown as a continuation of the central axis, we also know the so-called "long - or side - cephalia", which appear for example on *Facheiroa*, *Thrixanthocereus* and *Cephalocereus*. We may distinguish two different areoles, vegetative and fertile (flower forming) areoles. On a mature plant, able to produce flowers, the lateral areoles change, become flat and part in two, one part producing predominantly bristles and the other part producing predominantly woolly hair. The fertile areole is sunken inward and presents an appearance of the cephalium growing straight out of the central core of the columnar plant. Botanists have established for some time that this is not so. Backeberg made this error, which resulted in the establishment of the new genus *Pseudoespostoa*; hence this name is not valid.

A third type of cephalium formation can be observed in the genus *Neoraimondia*, which occurs in Peru and there forms mighty plants up to 12 m (nearly 40 ft) in height, which produce several side shoots from the single main stem - *Neoraimondia* arequipensis and *N. gigantea*. After reaching a certain height the main stem will discontinue its growth and the lateral branches will - in time - reach the same height as the main stem.

The cephalium of *Neoraimondia* is a so-called "short growing" cephalium. Out of the very woolly areoles of the main stems, which are able to produce flowers, the spination gradually decreases and cone shaped structures develop - the cephalia. The flowers will only appear from the youngest part of the cephalium - the older part nearer the stem dies down outwardly and this brings about the cone-like appearance of the cephalium. The fruits stay hidden in the cephalium until the flower falls off. A second, new cephalium can develop out of an old one.

On the occasion of a visit to the botanic gardens in Heidelberg last year, we had the rare opportunity of seeing and photographing two cephalium-bearing plants of *Neoraimondia* roseiflora. This species comes from mid-Peru and reaches a height of about 2 m. In general, plants of *Neoraimondia* which are capable of flowering and therefore carrying cephalia, are not to be met with in Europe. The imposing size of this rather antediluvian looking plant will make an emigration to Europe and a further cultivation in our greenhouses understandingly impossible. The slide of the Heidelberg *Neoraimondia* roseiflora with its numerous cephalia, each of which correspond entirely with a *Melocactus* cephalium, was indeed a rare delight to the eyes.

An excellent illustration of the cephalium and flower on *Neoraimondia* will be found as Abb. 271 in Backeberg's *Kakteenlexikon*. (Further notes on cephalia together with cross-sections will be found on pp. 7-9 of *The Chileans* No. 10 - H.M.)

PARODIA

Further extracts from the English Parodia Robin

..... from G.H. Linney:

"I've grown a few from seed and through many methods I use in the care and cultivation of my collection I've been dubbed 'the member with the unorthodox methods'. Mostly as a laugh I suppose, but the methods I use are ones I've experimented with and found to work. When I grow from seed I use small pots, a tea tray, cotton wool, a little sand, fine gravel, a very small amount of chalk and sedge peat. No propagator, no heat warming cable. I stand the tray on a box so it is about seven inches from the underside of the staging. Next I put cotton wool at the bottom of the pots and pull a little through the hole, then put an inch of sand on top of that then on top of that again the seed compost. I stand the pots in the tray in half an inch of water and leave until soaked through, then label and sow the seeds.

"I don't cover them up - just maintain the level of water at half an inch. The compost I use is fine sifted sedge peat and fine gravel, the kind used in aquariums. I mix one cup of peat to two cups of gravel then when this is mixed together well I add one level teaspoon of powdered chalk to each twelve cups of mix and mix in well. With this method I have had quite good success - 60% to 80% - even with Parodia. I start to sow towards the end of April.

"When potting up seedlings I use the same compost for all my plants - have done for years. That's John Innes No. 2, sedge peat, fine gravel, no sand, and small ground charcoal. To 12 cups of J.I. No. 2, I add 4 cups of gravel, 1 of sedge peat and 1 teaspoon of charcoal, nothing else."

..... from N.T. Hann:

"On the question of soil composition I note a distinct difference in my own compared to that of other contributors in that nearly 50% of my mixture is very coarse sharp sand. This provides excellent drainage and prevents any root loss - which did occur with my Parodia chrysacanthion with too fine a sand in my earlier mix. My ingredients are as follows:- 15 parts very coarse sharp sand, 5 parts each of garden soil (mine contains small quantities of wood ash and leafmould), of peat, and of chalk chips, plus 1 to 2 parts each of bone meal, wood ash and charcoal".

G.H. Linney enquires what *P. cardenasii* is like when larger than a seedling. "My specimen is now about 2" across. The plant is without ribs and bears rounded warts. Its general colour when I acquired it last year was bronze, but this has now changed to more of an olive-green, though it tends to remain bronzed on the new growth. The crown is dished rather like a saucer, a feature enhanced by the absence of spines in the new growth. The spines become relatively quite long and thick with the formation of flower buds, an occurrence not uncommon in other cacti. These were of a light brown colour in contrast to the white lower spines and all perfectly straight. The appearance of the buds was pinkish although they had the usual woolly coat interspersed with hair-like spines; when it eventually bloomed the flower colour was yellow.

"I have not long been in possession of *P. Salta* and am wondering whether this is a new introduction - I can find no reference to the species anywhere. I notice from studying the map of N.W. Argentina in the Chileans No. 10 that Salta is both a town and a province of the same name".

..... from F. Stanley:

"My plants are all in a mix consisting of two-thirds pea gravel, one third peat, with charcoal, potash, bonemeal and gypsum added. All Parodias are in plastic pots - as such they seem to have grown well and I do not suffer from loss of roots as mentioned by several contributors".

..... from R. Carter:

"Like other members I have lost roots on some Parodias, but the impression I have got is that it is not a case of the compost used - rather a matter of cultivation. To me the bulk of their growth is made in late summer; following this, then to water in early spring is to do so when the plant is more or less dormant - in other words they commence growing later in the season than most cacti. I plunge all my plants in a mixture of 50-50 peat and industrial vermiculite; I fancy that the slight trace of moisture at the roots throughout the winter also helps. My plants are all in clay pots. In the last three years I have not lost any roots on my Parodias. I use J.I. No.2 with a quarter part extra grit, varying this slightly for individual needs.

"I have noticed that, in some species, the flowers are further away from the crown than others - is this a characteristic of certain groups? The spiralling of the ribs, referred to by several contributors might also be worth pursuing - I have several where the spiral is quite distinct. Spination also seems to vary between groups - I notice that *P. sanagasta*, *rubriflora*, and *catamarcensis* are quite heavily spined and the body readily visible, whereas *P. sanguiniflora*, *microsperma*, and *aureispina* are more densely covered with lighter spines, whilst *P. nivosa* and *chrysacanthion* have straight spines with no trace of being hooked. Is it worth pursuing these features to form a key for *Parodia*?"

..... from E.W. Barnes:

"I note that G.H. Linney adopts Lamb's method of seed-raising. I employed this method for a few years, but gave it up in the end. Eventually the cotton wool wicks rot away, after which very little water is conducted to the compost - if the pots are tall, the topmost and most important part of the compost is too dry. I tried asbestos wicks - with the same results. Algae also soon forms on the surface of the compost and unless a purely mineral strata is used, damping off is a real hazard. With a seed-sowing medium such as pure silica sand - which holds water better than plain sand - seed germination is good; damping off is almost non-existent for quite some time and uniform wetting of the compost easily maintained by the wicks. But such a compost contains very little nutrient and after the first few weeks of their lives, seedlings begin to flag unless liquid feeds are given regularly. These need only be very weak but are essential with this method. Root growth is astonishingly good, as seedlings grown in such barren compost as sand and a little peat are constantly enlarging their root systems in search of nourishment. However, I must not decry other methods as these are merely my own findings.

"I now raise my seedlings in plastic trays filled with Levington compost. This is a mixture of peat and fine sand plus fertiliser. These trays are placed over the central heating pipes in the greenhouse and are sprayed overhead every day, this being the only form of watering they receive. Once this compost is wet I find no difficulty in maintaining the moisture constant. I don't prick out until August and then into a leafmould/sand and fertiliser mix.

"Germination is nearly always excellent with Parodias - it's later the trouble starts. It is a waste of time to sow any seed before the end of March as there are too many short days. As the days lengthen, however, germination improves. It has recently been established that *Parodia* need a constant temperature of app. 70°F to germinate well - high temperatures are fatal as the tiny seedlings soon dry out too much. In habitat, *Parodia* seeds fall between crevices in the surface of the earth, or are blown there or against rocks. Here the temperature is constant - during the night the rocks radiate the heat they have stored during the day - and there is some humidity. As many *Parodia* seeds are so tiny it is easy to imagine how far they may penetrate into the surface of the earth. After the first rains they may have been washed down even further between stones, etc., and in this highly humid atmosphere they begin to germinate.

"After transplanting it is important not to let the seedlings dry out; a good soaking with colloidal copper fungicide will protect them from rot. Grafting is by far the best method of bringing them through the critical first 12 months of their lives".

..... from H.Middleditch:

"Like Keith Smith, I doubt the correctness of some of my plant names. How are we to deal with this problem? Are we to suggest to the puzzled owner 'Oh - just look it up in the Lexicon'. Or would a key be of some advantage; or could we not, as a start, divide up Parodia as R.Carter suggests into say (a) straight spined/ hooked spined (b) with distinct two-way spirals/without. (c) Flowers from the crown/ from the shoulders of the body. (d) Largish flowers/ smaller flowers. (e) Long hooked spines like maasii/others ... and so on. Can anyone suggest any other features worthy of consideration?"

..... from A.J.Worrall:

"I would add (f) distinct ribs connecting tubercles on one axis, to the above basis for a key.

"I have recently acquired a *P.tilcarensis* which is tall and tapered, as Tony Johnston describes. Mine is about 6" high and about $2\frac{1}{2}$ " diameter at the base with an almost constant taper to about $1\frac{1}{2}$ " at the crown. The growth is very even and I think that this form of growth is normal.

"My plant of *P.cardenasii* is $1\frac{1}{2}$ " high and $2\frac{1}{2}$ " diameter, has 16 ribs in a clockwise spiral, epidermis between green and olive green, crown depressed. The tubercles are very globular, two thirds the depths of the ribs and $\frac{3}{4}$ " apart. Areoles app. $\frac{1}{4}$ " by $1/8$ " with white wool, 11 white radials $3/8$ " long, four stronger central spines dark brown for the last third of their length. The flowers were primrose yellow inside and dusky yellow outside.

"Although I have heard of several plants of *P.Salta* with variously numbered suffixes, I have seen no write up in the literature."

..... from Mrs.C.Winsland:

"Like Alan Sadd I have noticed that a plant flowering for the second time in a season will often produce a flower of paler shade than the first time. One plant where this was most noticeable was *P.mairanana* - the flowers produced later in the summer were of a much softer orange.

"Like many of you I have had trouble with loss of roots; the one that gave me most trouble was *P.chrysacanthion*. This year I have varied my compost, adding a little bone meal and gypsum to my soil mix and not only has it kept its roots but has a cluster of buds forming."

We have about ten species of Parodia in our slide library and any additions will be very welcome - A.W.C.

PARODIA SETIFERA Backbg by W. de Cocker

Translation from "Cactus (Journal of Cactusweelde, Dodonaeus, Linnaeus and Succulenta - The Hague) May 1969 by W.W.Atkinson.

In the years 1934 to 1939 appeared the "Blatter fur Kakteenforschung" published by Curt Backeberg, and in each of which he gave a description of a plant, always very concise, on a separate sheet and with an illustration. These descriptions appeared in four languages; apart from the original German, the English, Dutch and French versions were supplied by Mrs.Higgins, Dhr. Duursma and our countryman Dhr. Van de Weghe of Ghent, respectively.

As well as earlier known plants, reintroduced to the market by Backeberg, appeared many new descriptions with Latin diagnoses. So, for example, we find in number 7 of 1934, alongside *Parodia aureispina* and *P. mutabilis* also the original description of *P. setifera* (wrongly quoted as *P. setifer* which is contrary to the rules of nomenclature; later corrected by Backeberg).

As for the meaning of the name, this comes from the Latin *saeta* = stiff, brushlike hair, thus looking like a brush.

As with most of the descriptions of that time, no exact habitat was quoted, only Salta at 2,600 metres high. When one realises that the province of Salta is 5 or 6 times larger than Belgium, it seems very vague, and one could search for ever to find these plants again. Later, more of these plants were collected and passed onto the market, but once again, this time for commercial reasons, were the locations not divulged.

In the following year Backeberg published, in *Cactus ABC* two more varietal names, but without valid descriptions:-

P. setifera var. *nigricentra*, "with pitch-black hooked central spines"

P. setifera var. *orthorachis*, "with narrow straight ribs"

Later, when "*Die Cactaceae*" appeared, he had no living material left of these two varieties, and opted not to set up valid descriptions, the inference being that they were only local variations of the type plant. Nevertheless the variety *orthorachis* is again to be found in collections. It differs considerably from the type plant in spination as well as flower colour. For example the flower colour is orange against lemon yellow in the type. Variety *nigricentra* is, so far as I know, unknown.

In the year 1938, Werdermann described yet another variety in "*Bluhende Kakteen und andere Sukkulente Pflanzen*" Table 144, folio 36 of 10th July:-

"*P. setifera* var. *longihamata* which, unfortunately, is no longer to be found in any collection. It differs from the type plant through its less numerous, but stronger radials (only 12, against 20 for the type) and the central spine which remains single (against 3 or 4 in the type) and much longer (up to 5 cm.)."

"The plants were collected by Harry Blossfeld and in 1936-7 sent to the botanical garden in Berlin-Dahlem, once again without any indication as to the place they were found."

Werdermann also says:-

"The illustrated plant which is grafted on *T. lamprochlorus*, I had originally taken as *P. setifera*. However, I saw later, one of Backeberg's original plants in the collection of de Heer Neumann at Lichtefelde. This year (1937) Blossfeld's plant is more developed and the spination so altered, that I am beginning to doubt the correct naming. I sent Backeberg, therefore, a sketch and description with a request to check if this plant coincided with any of the *Parodias* he had classified. Backeberg replied that the plant was closely related with *P. setifera*, but could not say if it was a new variety.

"As well as the differing spination there are also less noticeable variations in the flower structure, e.g. the length of the style and the number of pistil lobes (on comparison with the plant *P. setifera*-Backeberg in Neumann's collection). I did not have enough subjects to research as to whether these differences were constant. I have therefore placed Blossfeld's plant as a variety of the known *P. setifera*".

First and foremost we must note that Werdermann's description is based on a plant that was grafted on *T. lamprochlorus*. The good properties of this grafting stock are well known, and especially the tendency to accentuate the length of the spines of the grafted plant. The same plant grafted on *T. spachianus* or on its own roots might have markedly shorter central spines. In any case, the plants at that time offered by Uhlig under this name, were not the latter; whereas Werdermann states: 1 central spine up to 5 cm. long, the plants from Uhlig all had

3 or 4 central spines. The description is probably based on one single lot in which the central spine was a little longer than average.

To judge by Werdermann's illustration I presume that this is a kind that has little or nothing in common with *P. setifera*. Perhaps we meet occasionally the good plant amongst the countless imports that have recently been offered as species nova this-and-that, or under a name culled from pure fantasy.

Now back to the type plant. *P. setifera* belongs to the group "Microspermae", or the so-called true Parodias, which all come from north west Argentina. They grow near to the Andes range mostly at altitudes between 2,000 and 3,000 m. The seeds are very small and round, having a diameter of 0.4 mm. The testa is yellow-brown, smooth, and marked with a netlike pattern. The strophiole is about as big as the seed. On the basis of these seed characteristics I am now trying to set up a classification of this microspermae group and hope to come back to it later.

It is sometimes very difficult to sort out the numerous species and varieties of this microsperma group from one another; many are probably only synonyms, forms, or even just cultivated hybrids. Nevertheless one can make an exception for *P. setifera*, for with its milk white radial spines and centrals with the darker spot, this plant immediately stands out amongst all other Parodias. Nevertheless the plant is very often wrongly named, especially in the Netherlands, appearing in collections as *P. microsperma* var. *macrancista* with which it has, in fact, nothing in common.

Finally I shall quote Backeberg's original description and also that of Werdermann, who so carefully described the variety *longihamata*, and this in the silent hope that someone will one day rediscover this plant.

Backeberg's description - *Parodia setifera*.

Small, mostly flattened plants, with about 18 narrow, 6 mm high ribs of dark green. Areoles elongated, weakly felted, initially white-woolly, 6 mm apart. About 20 pure-white radial spines up to 8 mm. long; 3 or 4 central spines, flesh coloured to black, one hooked and turned back, later falling off, initially in the crown, all upright and tufted. Crown mostly white-hairy. Flower 3.5 cm. diameter, yellowish white. Fruit small, seed fairly small. Habitat: Salta, North Argentina at 2,600 m.

Description by Werdermann:- *Parodia setifera* var. *longihamata*.

Body: Apparently not, or not spontaneously, off-setting. Slightly flattened globular, about 7 cm. high and 8 cm. diameter. Crown slightly depressed; equipped with some woolly tufts and with upright, soft, long, brown and hooked spines around. Skin colour dull light-green.

Ribs: About 18 to 20, on the lower part of the body, continuous, between the areoles only lightly notched, about 1 cm. wide, and 3 to 4 mm. high; near the crown more or less clearly divided into obtuse warts.

Areoles: About 5 to 6 mm. apart, when young filled with short white wool, later bare.

Radial spines: 8 to 10, spread flat or pointing slightly outwards, straight, sometimes slightly bent, smooth, pure white or with brown spots, mostly less than 1 cm. (4 to 12 mm.) long, the side spines being the longest.

Central spines: Only one single, up to 5 cm. long, at the crown upright, older spines slanting downwards, light horn-coloured (new growth, however, brown) but the tip mostly darker and strongly hooked downwards.

Flower (in closed state): About 3 to 3.5 cm. long, slimly funnelform. Ovary \pm 3 mm. dia. Tube 1 cm. long, both armed on the outside with reddish pointed scales which carry light grey wool and one or more dark brown brushlike hairs in the axils, which on the flower tube can become more than 1 cm. long. Petals lancet shape, mostly slightly pointed, 2 cm. long and 2.5 to 3 cm. wide, gold-yellow. Stamens at the base of the tube, which they enclose thickly.

Anthers gold-yellow, curved inwards. Style 2 cm. long, whitish with 8 similarly coloured pistil lobes, 5 mm. long, which stick out far above the anthers nearly reaching the tops of the petals.

Fruit and seed:- unknown.

Habitat: North Argentina. Finding place not known (!)

There is a slide of *Parodia setifera* in our slide library - A.W.C.

GYMNOCALYCIUM OF THE TRICHOMOSEMINEAE SEED GROUP by Dr. B. Schultz.

(Translated from *Friciana* No. 6 1962, by K. Wood-Allun).

I am convinced that if you ask cactophiles which genus gave the most pleasure, *Gymnocalycium* would win hands down. Even over the white *Mammillarias*. I too have fallen under their spell since I began to grow cacti. I became a specialist and even later when my range of interest grew greater, the *Gymnos* were still my favourites. It is often the case that some particular plants grow dear to the heart of the grower and in my case it is, where the *Gymnos* are concerned, the group named by Fric as the Trichomosemineae. I consider them to be the highest expression of the creative power of South American nature. After all *Astrophytum asterias* would have looked somewhat similar if it had spines. These *Gymnos* are however much harder and seem to be made of stone. The plant body is brownish green, grey green, bronze to reddish brown. In this respect they remind one of the *Ariocarpi* of Mexico; whole appearance shows that they are fully suited to a hard life in the desert-like countryside where water is a rarity. They are mimicry plants, living stones, exactly the same as *Ariocarpi* or some *Mesembryanthemae*. They have an advantage over the latter in that they are not difficult in cultivation and they flower steadily all summer. For this group the shape of the seed is characteristic; the seed is approx. 1 m.m. long, the testa is a shiny light or dark brown, as if covered in varnish. It is shaped like a mollusc or a miniature helmet with the sides pressed in. If you look at this seed from any angle you will immediately recognize that it belongs to this group for it is like no other seed. This characteristic, together with others, proves that this seed has reached the highest state of development of the genus *Gymnocalycium*.

The other *Gymnocalyciums* have black seeds with a touch of brown - only the Trichomosemineae and Muscosemineae groups have brown seeds; those of the latter group are however different in that they are round and the testa is rough, like felt. According to Prof. Dr. Buxbaum's theory, the development tendencies in cactus seeds are expressed by the colour variation from black to brown. The brown colour represents an advanced stage of the seed where the intensive colouration is no longer in evidence. With other seeds, the brown colour is always a sign that the seed is not ripe - ripe seeds are black. Only in the higher stages of development do the ripe seeds also remain brown. The name Trichomosemineae was not derived from the shape of the seed according to Ing. Kreuzinger, the author of the revision, it came from the shape of the cells of the testa. Dr. Gregor, Professor of the Prague Technical University, prepared microphotographs with 250 x magnification for Fric. These showed that the cells of the testa of this seed bear a projection similar to a hair: the prefix Tricho is derived from the Greek for hair: and it is this characteristic which gives us the name for this group of seed.

From this group a series of species was described, many of them are similar to each other and between the different varieties there are transitional forms. This creates considerable difficulty of determination: the difficulties are increased by the publication of photographs incorrectly named. Imports which were incorrectly named were also distributed and there are many hybrids in collections. If any form of clarification is to be reached in this group we must keep to the original descriptions and relate these to the old authentic plants. According to A.V. Fric, the species *G. nidulans*, *occultum*, *platense*, *quehlianum* and *riojense*, belong to

this group. Other species also belong to it which have seeds of the same type. The descriptions were published in the following sequence:-

- G. platense 1896 as Echinocactus platense Speg.
- G. quehlianum 1899 as Echinocactus quehlianus, Haage jun.
- G. parvulum 1905 as Echinocactus platensis v. parvulus. Speg.
- G. asterium 1905 as Echinocactus stellatus Speg.
- G. bodenbenderianum 1929 as Echinocactus bodenbenderianus. A. Berger.
- G. occultum 1929 A.V. Fric.
- G. nidulans 1929 A.V. Fric.
- G. ochoterenai 1935 Bkbg.
- G. vatteri 1950. Buining.
- G. triacanthum 1959 Bkbg.
- G. riojense 1960. Fric ex Pazout.

Now we shall proceed to the history and fate of the individual names.

G. platense. *G. platense* was the first to be described in 1896: in that year Spegazzini published a report on his study trip to the Sierra de la Ventana, a mountain range in the La Plata province, north of the mouth of the Rio Colorado, where it meets the Atlantic. There he found a cactus which he described as follows:- "Body spherical, elongating with age, 8 - 10 cm high, 6 - 8 cms. in dia., crown flat with central depression, ribs - or rather a series of protuberances - 14 in number, straight or slightly spiral, obtuse between the ribs, the protuberances hemispherical and somewhat pentangular. They form a fairly sharp spur at the front; the areoles are elliptical, sunken with insignificant grey felty wool, spines usually seven in number, rarely less than 5, radiating, the uppermost being the shortest, the lowest the longest - up to 17 mm., white, purple-red, basally; outer petals grey-green, inner white". The species often grows, according to Spegazzini, in rock fissures on hills and in valleys.

After reading the description, Professor Schumann believed the plant to be *Echinocactus gibbosus* - which corresponds exactly. In 1892, Spegazzini was in Europe: he visited several well-known collections and mixed with the best cactus-researchers, such as Schumann, Berger, and Weber. As far as *platensis* is concerned, Spegazzini was inclined to support Schumann's view and in 1903 he named the plant *Echinocactus gibbosus* var. *platensis*. In 1905 however, a further publication appeared by Spegazzini - *Cactaceanum Platense Tentamen* (Preliminary investigation of *platensis* cactus) - where *Echinocactus platensis* appears again as a valid species. The author stated however, that the plant was very close to *Echinocactus gibbosus* and could be distinguished from it only with difficulty. One can recognize it nominally from its flowers, whose tubes are as long or longer than the petals. Four varieties were described - *typicum*, *quehlianum*, *leptanthum*, and *parvulum*. Finally in 1925 Spegazzini separated the two varieties *leptanthum* and *parvulum* from *platense* as valid species, but he did not mention *quehlianum*.

Meanwhile Britton and Rose allied themselves to Spegazzini's view in 1922 and stated that *platense* agreed with *quehlianum*. Since however, *platense* was described in 1896 and *quehlianum* only later, the first name is valid according to the rules of precedence. One plant named *G. platense* has appeared in European collections which Backeberg has now identified correctly as *G. leptanthum*. This plant has nothing in common with *G. quehlianum* - it has completely different seed and belongs to another seed group - the *Ovatisemineae*. We can also find a picture of this plant in Scheller's book of 1926, but the names under the pictures are confused. Reproduction No.91 of *Echinocactus peninsulae* was clearly incorrectly named: it is interesting to see how Scheller changed the description. The areoles had very little woolly felt according to Spegazzini but Scheller described them as having much brown woolly felt. Spegazzini described the lowest spine as the longest, whereas Scheller has it as the shortest. He also changed the colour of the spines from white to grey brown. Where originally the petals were white, Scheller has them red basally: Scheller admits that the plant was elongated globular, 14 ribs, but in his picture the plant is clearly flattened and has 10 or 11 ribs. In short, it is obvious that

the plant illustrated and described by Scheller has nothing in common with Spegazzini's *platense*. It does however, correspond with the plant grown under the name in European countries.

Alwin Berger published the description in accordance with Spegazzini's in 1929, but mentioned that *platense* was closely related to *quehlianum* and finally Backeberg has so altered Spegazzini's description that of the original plant only the name remains.

The spherical, later elongated body, became low depressed to roundish, the body once grey-green becomes blue-green. Spegazzini describes a fairly sharp spur on the protuberances - Backeberg states that the spur does not usually protrude. Spegazzini's white flower develops a red throat - this description certainly fits Backeberg's illustration Abb. 1639, except for the fact that Spegazzini observed numerous plants with 7 spines, some even with 5, whereas this illustration shows a plant with 9 spines. Whoever sees this picture will certainly not understand Spegazzini's statement that *platense* can be distinguished from *gibbosum* only with difficulty. Every beginner would spot the difference here. If the plants had been so different from each other as illustration 1639 is from the illustration of *G. gibbosum* (in *Die Cactaceae?* - H.M.) then Spegazzini could have easily convinced Schumann that his *platense* was a new species, but Spegazzini himself asserted that it was *gibbosum*. His own combination of 1903, which Backeberg also quotes, proves that.

I should like to draw your attention to the fact that in Britton & Rose Volume III, a photograph - No. 177 - is reproduced. This picture, taken by Spegazzini, corresponds to his original description - it is clearly a form of *G. gibbosum*. A.V. Fric brought back 5 & 7 spined examples of *G. gibbosum* from the Sierra Ventana: it is possible to study these in the Municipal collection at Brno. There is therefore ample proof that *Echinocactus platensis* - according to the original description and Spegazzini's photograph is a form of *Gymno. gibbosum* - as Schumann realised long ago and as Spegazzini himself admitted in 1903. If *G. platense* were identical with *G. quehlianum* then this would be merely a synonym. The whole problem can only be solved finally by study of the plants in the Sierra Ventana. As long as there are no imports from there, it is not possible to consider *G. platense* as a separate species.

One question which still has to be answered is what precisely it was that Fric believed was *G. platense* when he included it in the *Trichosemineae*. No conclusions can be drawn from this because the question of mere opinion and not the result of observation.

G. quehlianum. *G. quehlianum* is a generally known species which is widely distributed in collections. It was described by Haage junior in 1899. This description was published in Quehl's article. The author describes the plant as flat, approx. 7 cms. in dia., with 11 ribs broken into protuberances, 5 spines depressed, the two lateral being the longest, 5 cms., the lowest being the shortest. Between these 3 spines there is a further spine on each side, so that the upper half of the areole is spineless. All the spines are tough, basally wine-red, becoming horn coloured towards the tip, transparent. The flower was described later by Schumann: Flower snow-white, wine-red in the throat. Schumann's description was completed by means of a photograph which Quehl took himself. The plant was discovered outside Cordoba. This also corresponds to the statements of Spegazzini and others. Berger characterises the plants in precisely the same way, except that he has the dia. as 15 cms. and 8 to 13 ribs. Two varieties were published in 1948 and further varieties in 1959.

Variety *zantnerianum* Schick: pine green, 15 ribs, flowers lilac pink, with darker middle stripes, seed larger than the type.

Variety *rolfianum* Schick: ash-grey green, 10 ribs, spines ivory, basally red. Inner petals white, throat light pink.

Variety *albispinum* Bozsing: white spines and larger flowers, plants lighter green than the type.

Variety *flavispinum* Bozsing: differs from the type by its bright yellow spines.

Variety caespitosum Fric: grows in groups, has grey-pink flowers with red throat. Was described in 1926 by A.V. Fric. This description is valid for it was published before 1930. Actually the name *caespitosum* is the Latin diagnosis and characterises the variety at the same time. *Var. caespitosum* is not identical with *var. zantnerianum*. It differs in body colour, number of ribs, length of spine, and colour of flowers. In our collections can be found both the type with snow-white flowers and wine-red throat and the *var. caespitosum* with pink flower and also with wine-red throat. Both originated from Fric imports. I myself received a fine imported plant from Fric when he returned from his first trip to South America. At that time, he had a large number, not only of the type, but also of the pink flowered variety. At the present time we have no knowledge of the other varieties as larger plants. On the other hand there is an appreciable number of hybrids in collections: they have a variable body colour, a larger number of spines and also often a central spine which never occurs in the pure *quehlianum*.

Gymnocalycium parvulum Speg. was described in 1905 as *Echinocactus platensis* *var. parvulus*. According to the original description it is 1 - 3 cm. high and broad, a dirty ash-green, ribs mostly 13, spines 5 - 7 curved almost like bristles, adpressed 2 - 4 mm long, grey. The flowers are fairly large, the slender tube is longer than the corolla. The plant is well represented in our collections by plants conforming to the description. With a nourishing soil, plenty of water, and too little sun, they are somewhat larger, up to 4 cms. across.

G. asterium. *G. asterium*, the original description of *Echinocactus stellatus* was made by Spegazzini, again in 1905. The body is 12.5 cm. across and 2.5 cm. to 5.0 cm. high, flat-topped or depressed. Ribs 7 to 11, spines mostly 3, adpressed or curved, grey, 5 mm long. Flower 6 - 6.5 cms. long, externally dark green with white corolla.

Apparently it is found in abundance in dry mountain ranges in Cordoba, La Rioja and Catamarca. Britton & Rose did not recognise this species and declared it to be synonymous with *G. platense*. Apparently Berger agreed, for *G. stellatum* does not appear in his book. *Asterium* is a fairly problematical plant and views on the justification for the species are varied. In 'Kaktusy' by Pazout, Valnicek, Subik, a plant is shown in illustration No. 66, which apart from having 14 ribs, corresponds exactly to the description. This could, however, be *G. ochoterenai*, which should have 16 ribs. I too, have a plant with 16 ribs and in the Municipal collection at Brno, there are a number of this type. Illustration No. 1662 of Backeberg's book corresponds to the description in number of ribs and spines, but the latter are clearly longer than Spegazzini described. If one admits that in cultivation the number of ribs can increase and the spines can increase in length, the *G. stellatum* is well represented in our collections.

The description *Echinocactus stellatus* could not be recognised because another *Echinocactus* had already been so named. It was therefore necessary to give the plant another name. In 1952, Y. Ito did this and chose *G. asterium*. In 1960 a new variety was described by Pazout as *G. stellatum* *var. minimum*. Since the name *G. stellatum* had to be changed in accordance with the new rules and is now *G. asterium*, the name of the variety had to be changed in consequence. It is therefore, *G. asterium* Y. Ito *var. minimum* Pazout *comb. nova*. This variety is an interesting plant and it is a pity that only two examples exist, both in Pazout's collection. All growers hope that more will become available soon.

Gymnocalycium bodenbenderianum. Was described in 1929 as follows by A. Berger: 8 cm. across, grey-green, crown spineless with many small spherical pointed tubercles, ribs 11 - 14 low, broad, rounded, divided by sharp diagonal grooves into trapeziform protuberances, each with a sharp upward pointing chin. Areoles first dirty grey, felty. Spines 3 - 5, at first black-brown, later grey-brown adpressed; flowers medium sized, whitey-pink with brownish stripe. The description is completed by a clear photograph of an imported plant. The true species was imported into Europe in 1928 and offered for sale by the firm of Haage junior. Some years later Backeberg offered it for sale too, but his plants were similar to *G. asterium*. Two of these imports can still be seen in Brno. In my collection I have a true *bodenbenderianum* which corresponds to the original description and illustration, which I grew from seed offered

by Haage junior in 1928. The plant is self-fertile and in Czechoslovak collections there are a number of descendants of my plant. The plant has died out beyond the frontiers of our homeland, witness comments in Backeberg's book. Picture No.68 in Kaktusy does not show the true *bodenbenderianum* - in particular the bare crown with the characteristic spherical pointed newly growing tubercles are missing, the shape of the ribs is wrong too. In the true plant, these are much flatter and separated into trapeziform protuberances. Illustration No.1660 in Backeberg is of *G. asterium* and bears no resemblance to *bodenbenderianum*. Illustration No. 1661 is not of the plant it is said to be either.

G. occultum. *G. occultum* was named in 1929 by Fric. As far as I know, no photograph of the plant has been published. Fric himself claims, in Kreuzinger's revision that it was different from all the plants sold as *Echinocactus stellatus*, as well as those of *G. hossei* and *bodenbenderianum*. Backeberg opposes this and believes that the plant is *G. asterium*. From the plants brought back by Fric to Brno, seed was collected which germinated and produced uniform plants. Just like the imports, the seedlings were characteristic and did differ from the other species of the group. On the basis of thorough study and long observation, I describe the plant as follows:-

G. occultum Schutz ex Fric sp. nova. (*G. occultum* n.n. in Fric's catalogue of 1929). Body low up to 10 cm. in dia. and flattened globular, dark grey-green almost black, epidermis coarse, flat, crown moderately depressed almost filled with spines; ribs app. 14, very low, with short diagonal grooves which do not spoil the symmetry of the ribs, the grooves between the ribs straight and shallow; areoles 10 mm. apart, at first moderately felty, later bare. Lateral spines only three in number, two facing diagonally downwards, the middle one pointing straight downwards; sometimes two further spines above the three laterals, growing horizontally. All spines 3 - 4 mm. long, black and shiny, later horn coloured, not transparent, tough, moderately inclined to the body, some irregularly curved. The flower is 4 cm. long, the tube greyish-brownish-green. The sparse scales have a lighter edge, corolla dirty pink, petals lanceolate, seeds shiny brown approx. 1 mm. long, shape as in others of *Trichosemineae* group. Place of discovery: Cordoba, Argentina, Holotype, municipal collection in Brno. The dark body colour is particularly characteristic for the species: it would be a pity if this beautiful and interesting plant remained without a valid description.

G. nidulans. Was also included in the *Trichosemineae* group by Fric. He imported the plants and offered seed for sale. I still have an offset from one of the imports but I have not yet succeeded in obtaining seed from it. Backeberg, when describing *nidulans*, described a species of the *Mazenensia* subgroup of the *Microsemineae* group. So long as we have no *Gymnos* with long spines and shell-shaped seeds we cannot form a final judgement on the problem and we cannot publish a description. Fric's seed offered under the name *nidulans* certainly had nothing in common with that of Backeberg.

G. ochoterenai. Was described by Backeberg in 1935 in *Kaktus ABC*: at the same time a photograph was published which later appeared in "Blatter fur Kakteenfreunde" and then also appeared in his work "Die Cactaceae". For this olive-green plant, the protuberances around the areoles are characteristic, so that the groove between the ribs is wavy. It is this wavy appearance which distinguishes this species from the otherwise similar *G. asterium*. A typical plant should have 16 ribs, but this is rare. Jan Suba had great success with seed brought from Backeberg and the seedlings were very similar to *asterium*: identification is made more difficult since the place of discovery is not known.

Var. *cinereum*. Was described at the same time as the type. It has a more ash-grey colour, the protuberances are more bulging, broader, the cross groove has a small three-cornered surface. The spines are shorter and almost blackish at the crown. The waviness between the ribs is less pronounced. The place of the discovery is also not known. Backeberg found both plants in Buenos Aires at Stummer's, but could not establish where they had been found. As stated by Backeberg, they have never been found again.

G. vatterii. Was described carefully and comprehensively by Buining in Succulenta in 1950. It is a very interesting Gymnocalcium which at first has 3, later only one strong spine, up to 2 cm. long. It was discovered in the village of Nono in the Sierra Grande in Cordoba, at a height of 800 - 1000 m. A few years ago I received seed from Mr. Buining from which I raised several nice plants, which were soon flowering and producing seed. This lovely species will be increased in the coming years and will be a firm favourite with us. The description has it that the seed is shiny light brown: our seed corresponds to the description. They are considerably smaller than the seeds of other species of the group. According to the shape of the seed, the question as to which group vatterii belongs is definitely answered. It is Trichomosemineae and the view that it is related to *G. sigelianum* is not acceptable.

G. triacanthum. This species was described by Backeberg in 1959 and is completely different to the preceding ones. The body is higher and not so flattened as the other Gymnos of this group. Colour a bluey ash-grey green, with 12 relatively flat and not very tubercled ribs. Almost always 3 spines, two growing laterally, the third downwards. Backeberg did not know where it was found and he did not describe the seed. Two plants are in the collection of the Jardin Exotique at Monaco. When we read the descriptions we wanted this novelty for our collections: according to the illustration it is indeed something different and beautiful. I was therefore pleasantly surprised to find in the collection of my friend Paul Choura in Duchcov a Gymno which fitted the description very well. It is clearly different to all the other species. The body is broadest at the top and narrows conically towards the base. Crown flat and moderately depressed. The abnormally flat ribs are actually only discernable by the shallow grooves which separate them.

The cross-grooves are short and no way disturb the generally smooth surface of the plant. Epidermis semi-matt, dark grey-green with touch of bronze. I thank Mr. Choura for lending me the plant so that I could study it and photograph it. Offsets can be found in my collection and in that of Mr. Rudolf Dlouhy in Jenekov. Later I found out that Monseigneur Th. V. Cichra in Ceske Budejovice, a well-known Gymnocalcium specialist, has two plants. In 1960 he succeeded in germinating seeds and the seedlings can today be found, grafted, in a number of collections. I found the fourth plant in the collection of Dr. Koller of Olomouc. For this rarity we have to thank Jan Suba, who grew them from seed, whose origin is not known. It could possibly be a separate species. My friend Cichra holds this view and further study is necessary to solve this problem.

Gymnocalcium riojense. Was imported by Fric in 1926 and seed was offered under this name. A valid description was not published and I did not see a photograph of it at the time. Clearly Fric brought only seed. These germinated badly and the seedlings did not thrive. By good fortune a few examples were kept in Prague, which at first, increased vegetatively. Later seed was obtained: the seedlings from this were very different to the mother plant and I have grave doubts about their trueness. There now exists true, less true, and doubtful, riojense. It will be necessary to devote a lot of attention to this most rare plant and to try to obtain pure seed. A suitable description was published in 1960 by Pazout in Kaktusy, accompanied by a very good photograph.

G. riojense is closely related to *Gymno. bodenbenderianum*; both originate in La Rioja. *G. riojense* differs principally in that it does not have the young spherical warty protuberances in the crown like *G. bodenbenderianum*. The ribs are more numerous, higher and not divided so clearly into trapeziform protuberances, as *bodenbenderianum*.

I believe that we should study very carefully the plants in this group to establish whether other types do not exist in our collections which we can establish as varieties or at least as forms. In this way it would be possible by exchanging pollen of plants of this seed group to obtain true seed. The Trichomosemineae, the Ariocarpi of South America, certainly deserve this effort. I feel that the species of the group fall into two sections. In the section which I have called *stellata*, most species belong. On the other hand I believe that only *bodenbenderianum* and *riojense* belong to *riojensia*. *G. nidulans* Fric is quite another problem.

GYMNOCALYCIUM subgenus TRICHOMOSEMINEUM

Abstract from 'Genus *Gymnocalycium* Pfeiff' by Dr. B. Schutz
(Translated by E. W. Bentley from *Friciana* Vol. VII No. 46, 1968.)

Small to medium-sized plants, scarcely exceeding 15 cm in diameter, very flat, mostly solitary. Fruit club-shaped, splitting vertically. Seed up to 1 mm diameter, shell-shaped i.e. hemispherical, somewhat compressed, broadening towards the hilum. Testa light to dark brown, glossy as if lacquered. Hilum basal, elliptical. Hilum margin prominent, mostly light.

Type species: *G. quehlianum* (Haage jnr.) Berg.

(Note: in the last few years so many forms have been imported that a division into species subgroups is not yet possible. It will only be possible to establish closer relationships after fundamental field work and many years of observation of the plants, especially of seedlings in cultivation.)

Species in this group:

<i>G. quehlianum</i> (Haage jnr) Berg.	<i>Gymno. sp.</i> Tell.
<i>parvulum</i> (Speg) Speg.	sp. U 71
<i>asterium</i> Y. Ito.	sp. U 74
<i>ochoterenai</i> Backeberg	sp. L. Col.
<i>occultum</i> Schutz	sp. solit. L. Ros.
<i>triacanthum</i> Backeberg	sp. Plat.
<i>vatteri</i> Buin.	sp. Hig.
<i>bodenbenderianum</i> (Hoss) Berg.	sp. Ser.
<i>ragonesii</i> Cast.	sp. L. Cost
<i>riojense</i> Paz.	sp. Quines
<i>intertextum</i> Backeberg	sp. Quicas
<i>kozelskianum</i> Schutz.	sp. San Pedro
<i>moserianum</i> Schutz.	sp. S. P.

Comments on *Gymnocalycium* of the *Trichomosemineae* Group

..... from H. Middleditch.

The species of *Gymnocalycium* within this group can be identified with complete certainty from the characteristic seed, with its very prominent hilum margin (illustrated in *The Chileans* No. 12 p. 95).

Apart from the unifying seed characters, there is also a fairly general similarity in the body habit of the species within this group. These characters may be stated as follows:-

- a. Body flattened globular, not growing as large as most other *Gymnocalycium*.
- b. Grooves between ribs relatively shallow, ribs not markedly prominent.
- c. Ribs not deeply notched into prominent tubercles.
- d. Only radial spines, no centrals.
- e. Spines fairly short, up to about 15 mm long.
- f. Spines either radiating or - if more outstanding - curving back towards body.
- g. Spines commonly bicoloured, dark or reddish coloured near base and paler for most of length, as far as the tip.

A number of these characteristics can be found in other species groups of *Gymnocalycium* but I do not think that this combination of characters can be applied to any species group other than *Trichomosemineae*. Thus we are provided with a means of identifying an unknown *Gymno.* by first establishing into which of the half-dozen or so species groups it falls.

There are three plants included in Dr. Schutz's 1962 article which pose problems in fitting them into this group. Firstly *G. nidulans*, which is quoted by Dr. Schutz as having 'long spines'. The plant of *G. nidulans* seen in his collection during our 1969 Tour, had spines about 20 mm long, in addition to which they were quite distinctly upstanding, with a curve away from the body. I would also have described that plant as having a central spine. The body was quite globular, not flattened globular.

On each of these accounts the plant does not comply with the features typical of a plant in the *Trichomosemineae* group. It is of interest to note that, in his 1968 revision, Dr. Schutz placed this plant into the *Mazanensia* species group of the *Microsemineae*: one wonders if, between 1963 and 1968, seed had become available which was not too hard to settle the question at an earlier date.

Thus one of the three problem species can be deleted from this species group.

Next we come to *Gymnocalycium platense*. Dr. Schutz's comments on this species are indeed a veritable mine of information. They explain how both *G. leptanthum* and *gibbosum* came to be associated with *Gymno. platense* although neither are in the *Trichomosemineae*. If we are to accept the seed characters as a means of classification, then we must accept the separation of *G. platense* from the other two species.

The original description of *G. platense* by Spegazzini, as quoted by Dr. Schutz., states 'Radiating spines up to 17 mm'. From Backeberg's *Kakteenlexikon* we find that *G. gibbosum* has 'radiating spines [±] upstanding, 1 to 3 (-5) central spines'. There is no spine length quoted: it would be of interest to know if the original description by Haworth of *G. gibbosum* was more explicit on this point.

Nevertheless, the existence of central spines on *gibbosum*, together with the upstanding character of the radial spines, does make one wonder how both Schumann and Spegazzini could consider that *platense* was allied to *gibbosum*. Even more puzzling is the comment by Dr. Schutz who uses the phrase 'which corresponds exactly' when relating *G. platense* to *gibbosum*. One finds it rather difficult to understand how Dr. Schutz could make this comment about two such dissimilar plants. I use the word dissimilar not only as I feel a botanist might do, but also bearing in mind that Czech cactus collectors have had a special interest in *Gymnocalycium* for many years and have for long been a source of new names based upon some difference in habit which in many cases would probably not be accorded quite the same standing outside that country - differences finer than those between *gibbosum* and *platense*.

However, Dr. Schutz's basic query still remains - until we have seed from plants meeting the description of *G. platense*, which breed true, and which yield seed of the *Trichomosemineae* group, we are still uncertain of the affinity of this particular species.

The third problem species is *G. triacanthum*. The elongated body form described and illustrated by Dr. Schutz for this plant, differs markedly from all other species in this seed group and one would feel more assured of its inclusion here if seed was available for study.

On our cactus Tour this year we observed a fine specimen of *G. ochoterenai* in the collection of Herr Till at Attersee, carrying two fruits. These fruits were about 25 mm high and 7.5 mm diameter, more or less cylindrical above the narrowing foot, very slightly pinched in below the flower remains, which covered the full breadth of the top of the fruit. Fruit colour was bluish-grey with a waxy coating, with about eight very pale pink hemispherical scales with broad blue-grey midrib.

At the Linz Botanical Gardens we found a *G. quehlianum* carrying one fruit, which was

about 20 mm high and 10 mm broad at its widest, barrel shaped, dark purple-green in colour, with only four or five relatively large triangular scales, pinky cream with deeper pink tip and blue-grey mid-stripe. The flower remains covered the full breadth of the top of the fruit.

Also seen at the Linz Gardens was a *G. vatteri* carrying two fruits, wine jar shape (that is, as wide at one-third height as at the top, but smoothly and slightly reduced in diameter at about three-quarter height). About 20 mm high, 7.5 mm in diameter, very dark blue-green in colour with about six pinkish scales. Flower remains cover the whole of the top of the fruit.

A *G. ragonessii* was also seen at Linz, which appeared to have set seed but the fruits did not appear to be ripe. The long slate-grey fruits with a wax-like bloom were about 40 to 50 mm high and only 7 mm broad at the centre, gradually thinning to less than half this width at top and bottom.

A *G. platense* was seen in fruit last year in the collection of R. Williams, Scunthorpe; fruits some 18 mm high, 10 mm broad, widest at one-third height, hemispherical below, tapering above. Fruit mid-green in colour, flower remains very shrunk at base to one third width of top of fruit which was covered by a papery lid. I feel obliged to consider here the possibility that the plant may not be true.

From the above very limited observations we may gain a general idea of the form of the fruits in this group of plants. The fruit would seem to be dark-coloured with little trace of green, cylindrical to wine-jar to barrel shaped, with broad-based flower remains. Obviously further observations of a greater number of plants are required before one could regard this broad description as worthy of application to the Trichomosemineae group of *Gymnocalycium*.

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

Regarding the species *G. nidulans*, I would agree with Dr. Schutz's inclusion of this under the Mazanensis section of the Microsemineae, both on the appearance of the plant in my collection and the seed sample which I have examined. How Fric came to include it under Trichomosemineae I do not know - he was perhaps describing another member of the group since lost to cultivation.

I can throw little light on the 'platense' problem, except that of my five seed samples received to date, three are Ovatisemineae (as is *G. gibbosum*) and two Trichomosemineae. Of my own four plants, three look very similar and at least one of these three has set seed of the Ovatisemineae type; all three have dark green bodies, spines well raised from the body with a variation in hue from darkish to pale, from root to tip, but nothing like as marked colour change as is usual in other species in Trichomosemineae. The fourth plant (no flowers as yet) looks very different with whitish spines having reddish-brown bases - in other words similar to other members of the Trichomosemineae. Thus it would appear that there is still a chance that we may have a 'Trichomo platense' as well as a *G. gibbosum* variety under that name.

The species *G. triacanthum* interests me. If one compares Dr. Schutz's description (and also the photograph No. 1666 page 1731 in Vol III of Backeberg's "Die Cactaceae") with the descriptions of some of the varieties of *G. mihanovichii* of the Muscosemineae (K.u.a.S., Sept. 1964) there are striking resemblances. The shape of the mature flower bud and the shape of the plant body in the photograph are particularly noticeable. (Or are gremlins at work here again?). A glance at some seed from an authenticated *G. triacanthum* would soon decide this one, so if any reader has such seed I should very much like to be able to examine it.

It may be of interest to note that Dr. Buxbaum's latest classification of *Gymnocalycium* includes all the Trichomosemineae of Dr. Schutz under one heading - Series VIII Quehliana (seed type 7) and he defines his group in terms of the seeds only. Unfortunately he does not include a species list with his article.

We would welcome slides of any of the above species of *Gymnocalycium* into the slide library - A.W.C.

TWO GYMNOS FROM THE TRICHOMOSEMINEAE GROUP from C. Lazzari.

Gymnocalycium ragonessii was purchased from W.T. Neale & Co. during 1968 and is one of the most individual Gymnos that I have seen. The eleven ribbed plant body is a greyish blue-green in colour - practically spineless and absolutely flat and disc like. The new areoles have some wool which soon disappears and the chin-like protrusions between the areoles are completely flattened out in this plant and are marked only by a short horizontal incised line.

The flowers are unremarkable in colour - white with brownish markings on the outer petals but are remarkable for the length of the flower tube - very long and slender. Six flowers were produced during the summer of 1968, none opened fully and all inclined towards the sun.

Gymnocalycium asterias was purchased from Jolly's nurseries in Coventry earlier this year ('69) and is very compact and quite rotund in form. The plant body is blue-green in colour and the small rather fragile spines are creamy white. Several flowers have been produced - in shape rather like *G. damsii*, all white with pale creamy-brown markings on the outer petals.

The two plants illustrated are shown actual size.

TWO PROBLEM NAMES by G.J. Swales.

In his article on Trichomosemineae, Dr. Schutz devotes considerable attention to the problems associated with *Gymno platense* and he also relates how *Gymno. leptanthum* was drawn into this problem. My two illustrations are not intended to represent authentically named plants - they are the names on the labels as I acquired them and could of course be incorrect.

The flowers of the *G. platense* hybrid are a brilliant red and it is a most prolific flowerer. The actual parentage is unknown. The *G. leptanthum* has satiny white petals, the throat of the flower being pale cream in colour. This plant also flowers well.

The seed produced by the plant labelled *G. leptanthum* is of the *Ovatisemineae* type, but I have yet to obtain seed from the hybrid.

The illustrations show an interesting difference between the shape of the two flower tubes - that of *leptanthum* widening sharply near the top of the tube giving a slight urn shape to the flower, whilst the flower on the *platense* hybrid exhibits a steady taper from the base upwards.

I hope these illustrations will both stimulate comment and encourage readers to observe the flowers which occur on their own plants.

GYMNOCALYCIUM PLATENSE AND THE MISPRINT - IMP. by Walther Haage.

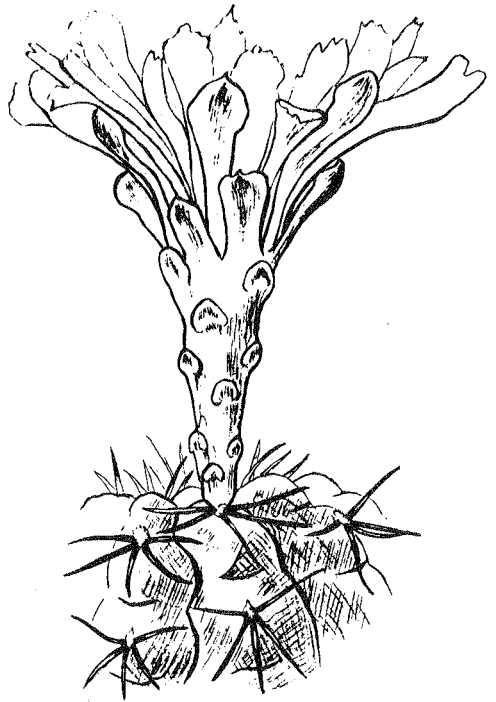
(Translated by G.J. Swales from *K.u.a.S* Vol 18 No.9, Sept. 1967).

In the first two and a half decades of this century, *Gymnocalycium platense* was a popular plant throughout the world, and as a seedling bloomed abundantly in beginners' collections. I have seen hundreds all told on different stagings so that the appearance of these beautiful plants was very familiar to me.

The diagnostic features were always the almost blue-green body with usually seven closely appressed pale spines, reddish at the base, arising from white felted areoles. Particularly striking though, was the unusually long flower tube with semicircular scales, their edges appearing more or less reddish. The pure white flowers opened only during full sunshine, so that the red throat did not often become visible.

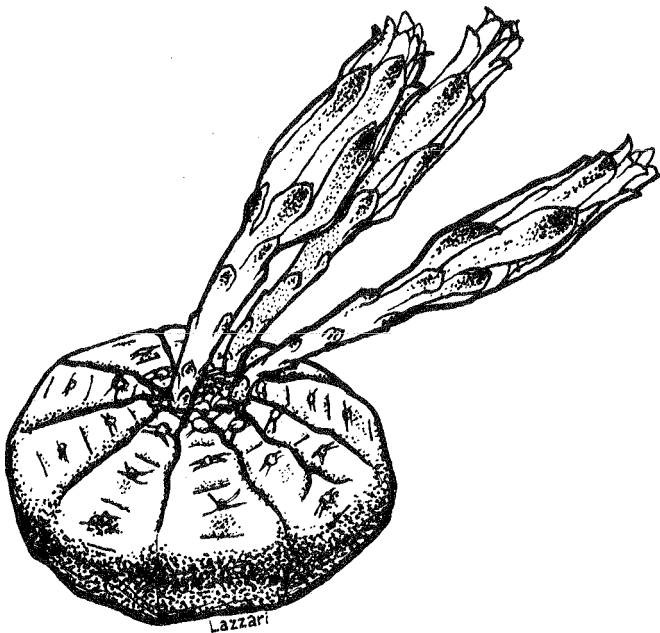


G. LEPTANTHUM
(x 1.5)

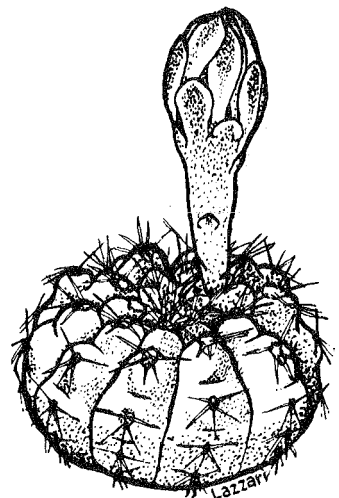


G. PLATENSE HYBRID
(x 1.5)

COLLECTION - G. J. SWALES.



G. RAGONESII



G. ASTERIAS

COLLECTION : C. LAZZARI

Why are these beautiful plants scarcely ever to be seen in collections today? Is it the misprint-imp to blame for this, he who has done it mischief not once but many times?

It began in 1923 in 'The Cactaceae' by Britton and Rose. When I received a copy of this work from Prof. Rose in Washington, I studied it thoroughly with great interest and I was obliged to make frequent correction notes by hand alongside the text. For our information in Erfurt we were told that in 1912 Rose had spent many long weeks going through all the species and noted many himself, but could not understand these mistakes.

So far I have described the genuine platense just as it is shown in Fig 176 in the third volume of 'The Cactaceae'. Indeed, platense was also supposed to be shown in fig. 177; it was something else - the form of the flowers was not correct. Fig. 178 is, I admit, described underneath as 'G. platense' but in the text it is said to be a 'photo from Dr. Spegazzini illustrating G. baldianum'. Plate XVIII Fig. 2 illustrates - in spite of the title "top of a flowering plant of G. platense" - some other plant entirely, possibly G. hyptiacanthum I should say, because it has a widely opening short yellowish-white flower and bright green body, neither of these features being characteristic of G. platense.

The plant emanating from Berlin shown in Plate XIX, I am able to agree with to some extent but because of the short thick tube, it looks more like G. quehlianum. Prof. Dr. Hosseus of Cordoba wrote in 1939 in Not. Cact. Argentiniensum, that the plant in Plate XIX was not G. platense but, on the contrary, a type of G. quehlianum. Spegazzini described the flowers of the smaller growing G. platense parvulum as 4.5 - 6.0 cm long, also remarkably imposing. In a lot of publications at that time, the long slender flower tube of G. platense is to be seen in pictures and mentioned in the text, e.g. the book by Alwin Berger and in the Journal 'Der Kakteen Freund' March 1933.

Then another impetus was given to this series of errors by the misprint-imp. In the year 1926 there was published a very popular book on cacti by Garden Inspector E. Schelle of Tübingen, showing in fig. 91 a true long-tubed flowering specimen of G. platense, with the title underneath "Echinocactus peninsulæ, Engelm." Fig. 120 on the other hand, showed Ferocactus peninsulæ from Lower California with the title below, "Echinocactus platensis Speg." In addition Backeberg in 'Die Cactaceae' Vol. III on page 1713 showed the true G. platense in fig. 1640 furnished with the title "G. leptanthum", whereas the Gymno. leptanthum of Fig. 1639 bears the name G. platense neatly transposed. However, in his Kakteenlexikon, Backeberg - possibly on the basis of these mistakes - has described the slender flower tube of G. platense as "only 2/3rds as long as that of G. leptanthum".

I obtained the true short-flowered G. leptanthum 20 years ago from Prof. Hosseus who had collected it in the region of Cordoba, whereas G. platense had been collected much further east (Rio de la Plata). Moreover, Hosseus in "Apuntes sobre las Cactaceas, Cordoba 1926" says "G. platense (Speg) Br. & R. only from the mountains of the province of Buenos Aires, G. leptanthum Speg. from Cordoba."

Both species have the reddish throat which is discernible only when the flowers are wide open in full sun.

Small wonder then, considering all these errors, that even in collections where G. platense is actually present, the naming conforms to these errors. In the outstanding exhibition by the Polish Cactus Society in Warsaw in June 1967, I came across very typical Gymnocalycium platense in beautiful floriferous clumps. Except - one found it deceptively under other names.

That Prof. Cardenas has made G. platense into the new combination G. gibbosum v. platense, seems to me rather hasty. G. platense has very few close similarities to, and many more differences from G. gibbosum.

MY JOURNEY TO CHILE. PART 2 - COQUIMBO by Karel Knize.

(Translated by H.Middleditch from Dodonaeus VI.3, 68).

It is in the province of Coquimbo where one finds some of the best countryside for cacti. Its main town, La Serena, is also one of the most beautiful old towns in the country. In this district, one can live only in the coastal region where there is the only arable ground. La Serena is a gentle valley which rises gradually for some distance into the interior of the country until reaching the escarpments of some 200 metres in height, where the first cacti are found. All along the coast, nothing is seen, unless it is a fine wide beach. The climate is very agreeable and one may bathe all year round; it only rains during the three winter months - June, July and August - while the temperature oscillates between 12 and 15°C.

The warmest time of the year is about January into the beginning of February - 40°C. All the province is a dry region, very dry indeed; however, the vegetation is relatively abundant - grasses, bushes, enormous colonies of Bromeliads and thousands of Eulychnias.

I moved around most of the time on foot only using a vehicle or a donkey for the longer distances. My first excursion took me to the village of Islon as far as El Romero - on foot - being about 50 Km out and back, which took me a day and a half. During the first 15 Kms, the route was only just practicable and the surroundings completely petrified by the drought; all the vegetation, cactus and otherwise, was suffering terribly and was covered by a very heavy coat of dust; but on reaching the heights to the left of Islon I discovered, between the rocks, some admirable *Neoporteria clavata* anchored in the clayish sediment held between the stones. All the *Neoporteria* of this province have only few roots, somewhat weak and slightly branched and directed towards the west. Further off, in the surroundings of Las Rojas, I discovered the very fine *Neoporteria* of the group *clavata* and the variety *procera*, introduced by F. Ritter. They are found at an altitude of 300 meters where the mountains rise out of a plateau with fairly typical soft and sandy soil, practically without stones and of dark brown colour.

Cheerful but very tired, I was continuing my exploring when I discovered a superb group of *Copiapoa coquimbana* Kz 146, a *Neoporteria procera* some 60 cm tall, and another *Neochilenia* Kz 2 nearly covered with earth and which I believe to be *N. jussieui*. The places where one finds *Neochilenia*(s) are limited to some hundreds of meters, sometimes no more than ten meters, and this leads me to suppose that we do not yet know a great deal about the flora of these regions which may hold for us the likelihood of some more agreeable surprises.

Close to Aqua Grande, I found a very nice *Neoporteria* Kz 55 equipped with powerful spines and at last, close to El Romero, a *Copiapoa* Kz 46 (*macrocarpa* n.n. Knize). If one compares this new species with *Cop. coquimbana*, one may consider it as the taller, the fruits reaching as much as 3.5 cm in length.

On the other bank of the Rio Elqui, close to Algarobito, I harvested seeds of the *Neochilenia* Kz 61 and close to the Serro Grande a dwarf *Neochilenia* of which the diameter did not exceed 4 cm and which forms practically no offsets - *N. minima* Kz 4: I came across *Neoporteria microsperma* there also. Here I cannot forbear to think of my European cactophile friends in contemplating a veritable field full of thousands of *C. coquimbana* in flower.

I have undoubtedly devoted several long walks to the desert of Coquimbo, some of one day's journey, but others of as much as ten days; the hilltops there are especially dangerous on account of the extreme heat, of the biting cold (by night?? - H.M.) and the avalanches of stones.

To see some *Eriosyce* in habitat, I must make good my resolve to carry out a little trip to Vicuna, at 620 meters altitude, then turn off right to El Planque where one also comes across *Neoporteria senilis nidus*. In the vicinity of Elqui, quite close up against the rocky cliffs, where nothing lives except some *Eulychnias* seared by the wind, I found in the chalky and whitish soil *Neochilenia* Kz 97 (*van Baeli* n.n. Knize) one of the finest *Neochilenias* which I have seen: the epidermis is a whitish-blue and the chestnut-brown spines slightly curved. On the other slope, amongst the grass, hides the very rare *Neoporteria gerocephala* Kz 96. Both are of a surprising likeness.

Further on, close to El Tampo, I encountered the truly massive *Copiapoa wagenknechtii* Kz 103 which reached 60 cm in diameter. Pressing forward further onward into the Cordilleras, one finds *Eulychnia acida* Kz 7, 7 m in height, and one other typical columnar species, *Trichocereus chilensis* Kz. 106.

At the summit of these arid mountains, round about 2,800 meters. I found at last *Neochilenia kunzei* Kz 59 with the golden yellow spines. I counted round about 200 in the vicinity of Tilo, at the left of the Rio Elqui, anchored for the most part in the cracks and crevices of the rocks. Outside of these rare examples and of the occasional *Eriosyce*, one finds nothing else alive in these places. I observed two forms of *N. kunzei*: the traditional golden yellow form and the other which lived 200 or 300 meters lower - Kz 50 (*N. eriosyziodes*). The body is rather the shape of a shell, being short cylindrical, up to 60 cm tall, without off-sets, having yellow flowers, large, the flower tube having some hairs, or virtually glabrous. It appears to me therefore hardly rational to consider this species as a *Neochilenia* sensu Backeberg, since he himself considered this characteristic as essential for distinguishing *Horridocactus*. It might equally well be said that this species could be considered as a *Pyrrhocactus* sensu Ritter which would be much more justified than for certain other plants referred to this genus in a very debatable fashion, such as: *Pyrrhocactus simulans*, *iquiquensis*, Ritter.

I have seen in the neighbourhood of Andacollo a plant called *Horridocactus andicolus* n.n. Knize which should apparently be *N. kunzei*, as much as by its habit as by its flowers and fruits, similar in other respects to the *Neochilenia* Kz 83 of Copiapo.

In my opinion, the other *Horridocactus* such as *H. giganteus*, *heinrichianus*, *curvispinus*, form a separate group which one could call "the largest cacti"! I shall adhere throughout this account to the names proposed by Backeberg which leads me, for example, to use terms such as *Chileorebutia* because much remains to be done to determine quite definitely an indisputable nomenclature for classifying all these species.

For example, I have been able to determine the relationship between *N. kunzei* and *N. eriosyziodes* - the areas of distribution are of the order of 200 meters apart and the plants encountered at the Huanta Tilo and very rarely as far as Balala.

Plants collected in the mountains of the Cordillera from the region of La Serena.

- | | | |
|----|----|--|
| Kz | 1 | <i>Copiapoa coquimbana</i> , typical plant. |
| Kz | 2 | <i>Neochilenia jussieui</i> , small, up to 6 cm dia. |
| Kz | 2a | <i>Neochilenia jussieui</i> , another form. |
| Kz | 4 | <i>Neochilenia minima</i> , Serro Grande, one of the smallest, body coloration of deep violet. |
| Kz | 5 | <i>Neoporteria procera</i> , Las Rojas. |
| Kz | 7 | <i>Eulychnia acida</i> . |
| Kz | 8 | <i>Neoporteria microsperma</i> , Serro Grande. |
| Kz | 14 | <i>Copiapoa coquimbana</i> var. |
| Kz | 46 | <i>Copiapoa coquimbana</i> var. <i>macrocarpa</i> , very large fruit ⁺ 3.5 cm long, flower 5 to 5.7 cm dia.; El Homero. |
| Kz | 48 | <i>Neoporteria</i> sp. (which I have named 'nigra'), Serro Grande, probably a form of <i>N. microsperma</i> with very strong spines. |
| Kz | 50 | <i>Neochilenia eriosyziodes</i> - it is possible that this recent discovery by Ritter is in fact only a form of <i>N. kunzei</i> although the spines are slightly different. |
| Kz | 51 | <i>Eriosyce</i> sp., black spines, at 3,000 meters altitude; this novelty could be only a variety. |
| Kz | 52 | <i>Eriosyce aurata</i> of old; golden spines. It would seem that this spine tint is very common at altitudes of 3,000 m. |
| Kz | 55 | <i>Neoporteria</i> sp., Agere Grande, of pale yellowish green colour, pallid flower. |
| Kz | 57 | <i>Copiapoa</i> sp. (<i>imbricata</i>). |

- Kz Neochilenia kunzei, Balata Huante (number missing - H.M.)
 Kz 60 Trichocereus coquimbanus, at the edge of the sea.
 Kz 61 Neochilenia sp., Algarobito; flattened, up to 12 cm dia.
 Kz 62 Neoporteria clavata, Serro Lambert.
 Kz 63a Eulychnia sp., Las Rojas, rose-coloured flower, rare.
 Kz 100 Neoporteria clavata var. grandiflora.
 Kz 101 Trichocereus coquimbana var. longispinus.
 Kz 103 Copipoa wagenknechtii.
 Kz 106 Trichocereus chilensis.

It will be observed that in the text that Kz 55 is said to emanate from Aqua Grande, whilst in the foregoing list this name is rendered Agere Grande - H.M.

NEOCHILENIA NAPINA

In his article describing his collecting trip to Chile, Knize has accompanying photographs of some Neochilenia, all found in the same valley of the Huasco, but with varying lengths of spine.

One habitat shot shows us a napina with spines so small as to be hardly visible, which Knize quotes as being synonymous with glabrescens. A further habitat shot is of a napina with what are described as 'normal spines' - this plant being very similar to that shown on the accompanying illustration by Rene Zahra of a plant in his collection in Malta.

The third example from habitat is of a napina with spines so long that those on one areole are almost touching those on the next. Knize states that this is the so-called variety spinosior.

It would have been very interesting to have been able to take sample plants of each form of spine growth and cultivate them under similar conditions, to see if they then maintained their different appearance.

The accompanying illustration shows the wool on the flower bud, which surrounds and almost obscures the bud when it is not quite as large as that shown in the illustration. The colour of this wool varies from species to species in the Neochilenia; it is absent from the buds of Neoporteria sensu stricta which are pinky red from first appearance, and is also absent from the buds of Horridocactus, many of which are green when small. This feature can therefore be used as one factor to assist in classifying an unknown plant in the Neoporterianae.

We have several slides in our slide library showing various forms of N. napina - A.W.C.

MY CONTACT WITH COPIAPOAS by Dr. E. Priessnitz.

(Translated by E.W. Bentley from the January 1964 Newsletter of the Austrian Cactus Society).

The collecting trips that have been made more and more frequently in the last few years in the South American cactus areas have brought us a surprisingly large number of new finds and the rediscovery of many presumed lost species. Chile, which because of its geographical position and structure harbours a large number of cactus species, has as a result enriched our collections with numerous new and interesting finds. Besides many fine new species of the genera Neoporteria, Neochilenia and Horridocactus there has also been rich material enabling the keen Copiapoa



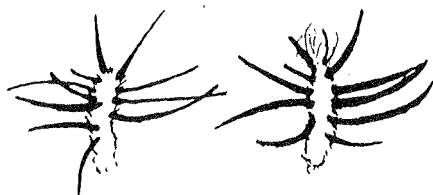
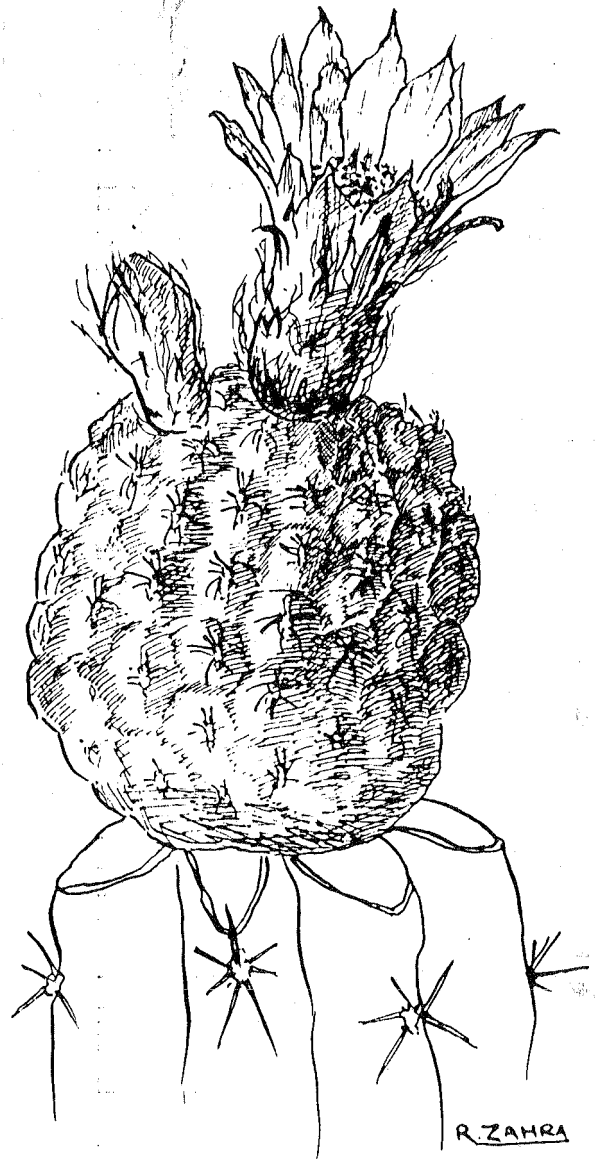
BUD. x 4

A few days before
the flower opened
for the first time.



FRUIT x 2.5

Fifteen days after
the flowers had
closed.



AREOLE x 15

NEOCHILENIA NAPINA
Collection R. Zahra

grower to extend his Copiapoa collection. Depending on the financial circumstances of cactus collectors importation took place of Copiapoa cinerea or haseltoniana which, like stone idols, sooner or later played the star part in many collections, or of bristle-covered Copiapoa pepiniana, fiedleriana and coquimbana, which as single plants or as groups gave us a small insight into the struggle for existence in habitat in their country or origin. Already in a state of suspended animation, most fought a tough battle against the murderous climate of our greenhouses. Where have they all gone? Those most favoured by fate are at best herbarium specimens in spirit or on dusty shelves. To these at least a cheerful obituary can be dedicated: sweet is it to die in the cause of knowledge. The rest of these proud creatures ended miserably in garbage pails or on the compost heap.

And yet they have shown us much. They have provided us with experience not only in the negative, but in the positive sense.

Have we, however, been in the last decade too much dependent in our growing on vegetatively increased plants, often on the propagation of one or a few imported specimens whose capacity for adaptation has made it possible for them to tolerate our growing methods, thereby basing our ideas of the appearance of an often very variable species on a single plant, which perhaps did not correspond well with the type and also in addition has been altered during cultivation. Furious has been the cactus grower who on the arrival of imports under a name which had quite definite connotations for him received something quite different. "This is the original Copiapoa haseltoniana, everything else is a hodge-podge": with these words I received an offset from a much cherished jewel.

It goes back quite simply to the orderliness and painstaking recording of every little spine of his plants by the cactus lover. Each plant differs in appearance yet all are the same species. Who knows what's what? Nature doesn't care. Above all in the self-sterile species the variation within the population in the homeland habitat is immense. This state of affairs brings the work of many systematists also ad absurdum. The reprehensibility of the facile publication of new descriptions is thereby placed in a revealing light. I myself find it interesting to possess several forms of the same species, to seek new ones in other collections, to exchange and thereby observe the multiplicity of developmental possibilities, to get to know the range of the single species and often at the same time the impossibility of defining its borders. And in this respect the Chilean cacti present us with an opportunity in the richest measure, equally whether we build up our collection with an aesthetic aim or a scientific one. Besides, when the possession of a species rests on one plant there is always the accompanying worry of losing it. Look at Copiapoa krausziana, including scopulina with its curly white, here and there brownish, bristly interwoven to stiff outstanding or soft spines, or Copiapoa dura, black-to-brown-spined, spherical or cereoid, single or clumped. How many forms can you find here, alone? In large seed sowings the richness of forms shows itself most clearly. See in this an attack on your sense of systematic orderliness, then rejoice over the immense possibilities open to you as a collector.

By selection, over generations, of certain features (spine colour, spine length etc.), and through seed propagated plants the same hereditary characteristics became established as self-evident. But we do not want cactus races, rather we want to ascertain and collect the range of the living species. Then will you upset many petty principles, whereby, perhaps to the regret of many, the possibility of scientific battles in miniature is lost.

Besides the old species - better referred to as the long-known species - which have come to us again in numerous importations in recent years, have been also numerous new finds of much more culture-worthy Copiapoas which have been perhaps only accessible to most collectors as seeds but today are found by the thousand in collections. Here in repeated collecting trips Ritter and Lembcke have contributed to the enrichment of our Copiapoa assortment through plants and more so, seeds. The catalogue of the firm 'Winter' in the years 1956 to 62 was a source of riches for the Copiapoa enthusiast. The range offered therein in most years was unique. In 1957 alone 31 different species and two varieties of Copiapoa were offered including many novelties among the finest the genus has to show. In the following year came yet others.

Unfortunately the bidding for names was often greater than the supply of seed. Many wishes remained unfulfilled. And yet in the course of this interesting year it was possible for the collector by his own sowings and through exchanges to increase his *Copiapoa* range. If I introduce to you here again some *Copiapoas* they will be fine culture-worthy new species which admittedly so far still are keeping me waiting for flowers, but which are excitingly beautiful, only unfortunately somewhat difficult or largely not obtainable.

Comparatively easy to get is *Copiapoa krainziana*. I possess more than fist-sized plants of this, covered thickly in coarse, white, flexible, bristly spines. The plants are sprouting strongly at the base and make handsome groups. The plants are easy to grow from seed and the appearance of our cultivated plants agrees well with imports. Grafted they grow very well without distorting. However, for the enemies of grafting (for such there are) the species can be recommended on its own roots. A variety of it would seem to be: *Copiapoa scopulina*, which Ritter has put forward as a separate species. In extreme cases it has rigid out-standing spines but I have seen all intermediates through to *krainziana*.

First offered as *Copiapoa malletiana* and later corrected to *Copiapoa intermedia* is one of the finest *Copiapoas* grown from seed in my collection. The light grey green plant body is provided with numerous ribs with weak protuberances. The plant is broad and squat, blackish spined on new growth soon going grey. It has a surprisingly large woolly crown from which project dark-grey to black spine tips.

The single red flowering *Copiapoa* according to Ritter is: *Copiapoa rubriflora*. This very green plant has knobbed ribs with brown-red, comparatively thin, mostly downwardly growing spines. In my oldest, fist-sized specimen crown wool has not so far appeared. The plant is beautiful and as it is a good grower, also culture worthy.

A young plant with a certain resemblance to the old *Copiapoa malletiana* is: *Copiapoa longistaminea*, a grey-green columnar growing plant. Around the areoles the ribs expand somewhat into humps. The spines are strikingly deep black to dark grey black. The plant with a warm over-wintering unfortunately tends to make new growth which is thin and unprepossessing. Complete winter rest in a light situation encouraging strong new growth affords a basis for this otherwise very attractive and beautiful species.

The last *Copiapoa* that I introduce to you today and which for the first time for two years has been obtainable as seeds, is: *Copiapoa longispina*. Already of striking appearance as a young plant the cylindrical somewhat downwardly directed tubercles bear grey-white, black-tipped, in many instances surprisingly long, spines. The plant body is dark green to dark brown green. As a graft the plant is a good grower and forms a centre of attraction in any collection.

..... Comments from H. Middleditch.

I can appreciate Dr. Priessnitz's reference to *Copiapoa rubriflora* as a "very green plant." Amongst my other *Copiapoa*, this species appears almost emerald green by comparison. Whilst my plant is not as large as that of Dr. Priessnitz, it is also without any wool in the crown, whereas other species of *Copiapoa* of similar size are already showing wool in the crown.

We have slides of *C. krainziana* and of *C. rubriflora* in our slide library. Slides of any of the other species referred to above would be very welcome - A.W.C.

COPIAPOA MONTANA RITTER - by A.F.H. Buining

(Translated by E.W. Bentley from Succulenta for January 1965).

Copiapoa montana Ritter in Cactus 1960 : 21, FR 522.

Copiapoas only appeared occasionally in our collections before the war. It was generally assumed that since these plants probably only occurred in the sand wastes along the coasts of Chile, they were particularly difficult to grow in our collections.

It is indeed almost impossible in the case of a number of these plants, so far occurring exclusively in Chile, to grow them in such a way that they have the typical chalk white integument as in their homeland. *Copiapoa cinerea* and *haseltoniana* especially, and the like, remain with us without this protective chalky epidermis.

Thanks to Ritter, all the growth localities of the genus *Copiapoa* have been revisited during a long series of years to try to rediscover species found previously and localise them. Naturally on these expeditions new species have been discovered which have frequently turned out to be surprisingly easy to grow and flower in our collections. Undoubtedly *Copiapoa montana* is one of these. This plant was found in the hills to the north of Taltal in the mist zone. It is therefore no wonder that it feels at home in our climate because it is accustomed to a cold, damp, environment. This so-called cloud or mist zone originates from mist wafted landwards from the sea during the evening and the night, where it remains hanging at a certain height in the hills. Here originated earlier the famous hanging gardens on the frequently steep west coast of the Andes range.

Ungrafted Copiapoas grow very slowly, but like many difficult cacti, do best in tins or plastic pots. Grafted on a strong *Trichocereus pachanoi*, my plant grows freely and has bloomed regularly all summer for some years.

It becomes 5-10 cm thick and 5-20 cm high, with 10-17 ribs. The areoles are 7-10 mm in diameter and felted. The black to brown or reddish spines of which there are 1-3 centrals and 4-7 radials are about the same length. The light yellow flower, with the citron yellow anthers and the marsh-marigold-yellow stigma, is about 4 cm long and 4-4.5 cm broad. The perianth tube is naked as in all *Copiapoa* described to date. (An exception to this, however, is *Copiapoa tenuissima* Ritter, in which the flower tube is hairy).

Comments on *Copiapoa montana* from C. Lazzari

The plant illustrated on the front cover was bought as a small seedling and is now about seven years old. I have read some comments suggesting that this species is rather unattractive in appearance - an opinion with which I would not agree.

The plant has thirteen ribs with pronounced areoles and the epidermis is a rather sober dark green contrasting well with the long, sharp, sienna brown spines which retain their colour with age. These spines are so long and stiff and close together round the crown that they prevent the flowers from expanding fully. The new areoles have abundant creamy white wool giving the crown of the plant a 'Melocactus' look. Several flowers have been produced during each of the two recent summers. The ten-lobed stigma, stamens and petals are all yellow with the outside petals having a central stripe of pale wine red.

Copiapoa montana, with *C. hypogaea*, has the advantage, amongst Copiapoas, of being easily flowered when relatively young - at least in my experience. It is therefore warmly recommended.

In Vol. VI of his 'Die Cactaceae' we find Backeberg saying of this species "it must be closely related to the more southerly growing *C. grandiflora*". He also comments upon how readily it flowers when young. Under *Copiapoa grandiflora* he observes that "Ritter characterises this species as 'having the largest flowers' ", and "whether they really are larger than *C. montana*, is not known to me for certain". - H.M.

A slide of *Copiapoa montana* in flower is available from our slide library - A.W.C.

NOTOCACTUS CAESPITOSUS (Speg) Bkbg. by A.F.H. Buining

(Translated by H. Middleditch from 'Succulenta' for September 1967).

Echinocactus caespitosus Speg. in *Cact. Plat. Tent* 1905 : 495

Frailea caespitosa (Speg) Br. & R., *The Cact.* 3: 211 (1922).

Notocactus caespitosus (Speg) Bkbg., *Kaktus ABC* 253 (1935).

Notocactus minimus Fric et Kreuz. ex Buin, in *Succulenta* 1940 : 86 - 90.

The above mentioned description from Spegazzini would appear to translate as follows:-

"Clump forming with 10-40 heads. Individual heads 4 - 7½ cm tall and 1½ - 4 cm in diameter. Ribs 11-12, very blunt, scarcely spiralling; areoles slightly sunken, 3-4 mm apart; spines brush-like; radials 9-11, adpressed, yellowish white, 3-6 mm long; central spines 1 - 4, a little longer and darker, especially the lowermost upward pointed and red. Flowers come pretty well out of the crown, 3½ - 4 cm long, covered with dense felt like hair, scaly, and with black, stiff, bristles. Flower petals sulphur yellow, style with 7 dark violet lobes. Almost identical with *N. concinnus*. On dry mountain places near Montevideo".

In his publication about the flora of Uruguay, "Flora Uruguayana", Volume II 1902, Arechavaleta did not mention the above named plant. It was apparently still unknown at that time. However, there is *Echinocactus apricus* in *Arech. 1902 : 205*, of which the location was recorded as Sunta de la Ballena in the vicinity of Maldonado, to the east of the city of Montevideo: this has little to do with our species, although later, for example, *Echinocactus apricus* was placed synonymous with *Echinocactus caespitosus* by C. Osten in "Notas sobre Cactaceae" of 1941.

The comparison of *E. caespitosus* with *E. concinnus* Monv. and also *E. apricus* with *E. concinnus* certainly does not hold for *E. caespitosus*. Indeed *E. apricus*, like *E. concinnus*, is a typical flat plant, whereas *E. caespitosus* always grows somewhat elongated.

If we examine the illustration of *E. apricus* on P.206 by Arechavaleta, the clumping is most striking. The appearance of the plant is quite different from *Echinocactus caespitosus*. It is immediately apparent that the clumping originated from damage at the growing point, hence also the small diameter of the separate heads of 3-4 cm.

The illustration of *Echinocactus caespitosus* Speg (= *Echinocactus apricus* Arech. according to Osten), in his above mentioned publication Nr. XXV *Herb. Osten* 16.838, has nothing to do with *E. caespitosus* Speg., since it has been overlooked that according to the description of Spegazzini this plant is taller than broad, while the flower description does not agree either.

The comparison of *Echinocactus caespitosus* Speg. with *Echinocactus apricus* Arech. and with *E. concinnus* Monv. is thus in no way valid. I hope to return to both the latter plants on another occasion.

We come now to *Notocactus minimus* Fric. & Kreuz. ex Buining. In 1931 two specimens of these plants were received by Fric from W. Kolischer among a consignment of *Frailea*. At this time Fric also had a contact with the collector F.C. Mueller-Melchers, Estacion Atlantida in

Uruguay. The assumption thus grew up that Kolischer and Mueller-Melchers had met each other (the number of people who collected cacti in South America was, and still is, exceedingly few). Mueller-Melchers (who has died since) wrote to me on Jan 18th 1950 "Frailea caespitosa is, I believe, no Frailea, if it is that which I know under this name. Yellow flower, and red stigma and anthers. With hooked spines. I collected many of them from the Cuchilla Negra in North Uruguay close to the frontier with Brazil. It is a Notocactus".

Thus we leave Mueller-Melchers.

The colour of the stamens does not agree with our well-known data, but it will be clear to you that, armed with this information, I hoped to find this most controversial plant again on my trip to South America. But first something more. From the grower Harry Johnson in California, I received in 1951 a plant under the name Frailea caespitosa. Johnson had received this plant from Uruguay from Mueller-Melchers. It appears to be a typical *Echinocactus caespitosus* Speg.

Dr. Hilberath from Wesseling in Germany, bought this plantlet at my suggestion during a visit to Johnson, so that now a few are to be found in our collections.

On Jan 17th 1967 Leopold Horst and I, after many formalities, drove over the border between Brazil and Uruguay near Livramento. Our objective in the first place was the town of Tacuarembó. This town lies at the foot of the Sierra de Haedo of which a number of Cuchillas (Coxilhas in Portuguese) form a part. The Coxhila Negra lies on the border between Brazil and Uruguay to the southwest of Livramento.

Just on that day we struck one of the very few rainy days in January, so that in the morning of Jan 18th we found it impossible to travel along the muddy unmade roads. About noon, as it had cleared up, we went part way back along the road towards Livramento where Horst had seen a little rocky spot in the rolling grassy plain. A Cuchilla is a series of hills, here and there having a more mountainous character. Indeed, at the aforementioned place we came across a particularly interesting *Notocactus*, of which more at a later date.

Now it so happened that in that enormously great region of the Sierra de Haedo with its many Cuchillas, there was originally discovered either a *Notocactus mammulosus* or a *Notocactus* transferred by Buxbaum from the discontinued *Malacocarpus*. Often then one also came across other more special species, such as the present case. As we went deeper into the hills, we both found at the same moment a group of small plants, which at once were recognised as *Notocactus caespitosus* (Speg) Backbg. It is difficult to convey what rejoicing there was - just about finding again a plant that was not really wellknown. We came across splendid groups there, as well as one cristate and, strikingly around a *Notocactus mammulosus*, an entire group of proportionately small *Notocactus caespitosus*. There was no evidence of any hybrids between these two.

At this place the shining white radials and the red hook-shaped central spines were most striking.

During our further journey the following day from near the very centre of the Sierra de Haedo from Tacuarembó towards Salto, we found upon a rather high mountain one further group of *Notocactus caespitosus* with somewhat yellow radial spines and two central spines. It was striking that at both places older plants had developed a long brush-like spination in the flowering zone, none being hook-shaped.

In view of the variability of this species which we came across, there could be no doubt that *Notocactus minimus* Fric & Kreuz. ex Buining is identical with *Notocactus caespitosus* (Speg) Backbg.

Backeberg placed *Echinocactus caespitosus* in with *Notocactus*, although he had never seen the genuine *caespitosus*.

This species grows in a soil-mix well provided with garden loam (for example from fen peat) with heather potting soil, for cultivation upon its own roots. In this way one ensures a pH. of not more than 5 to 5½.

Much of central Holland has been recovered from the sea over the centuries and the greater part of these lands have a thick surface covering of peat - just like our own fen country of Lincolnshire and Cambridgeshire. At places the underlying sand is without a covering of peat and those members on the 1963 Continental Cactus Tour of Holland will recollect stopping for lunch en route to Mhr. Buining at just such a place where the vegetation was mainly open woodland, bushes and heather - no doubt it is this naturally sandy soil to which Mhr. Buining refers when he speaks of 'heather potting soil'. The resultant mix recommended by the author will be a sand-peat compost very similar to the surface soil in our Fens where cultivation has mixed the surface peat with the underlying sand, and provides collectors fortunate to be situated at a suitable spot with a cactus compost from their own garden which - without any additions - gives excellent drainage and adequate moisture retention - H.M.

Comments on *Notocactus caespitosus* from K. Halstead.

I would challenge the description from Spegazzini as not being true of the species we know today. It only partly fits one of my four plants in this group and certainly the stigma colour is incorrect if my own *caespitosus* is reliable. My plant has a lemon not sulphur yellow flower and a bright red not violet stigma. Mueller-Melchers appears to support this but erred with the colour of the anthers which are yellow not violet. Perhaps he was referring to the stigma and style.

My own translation from Backeberg of Spegazzini's description includes:- stamens yellow, style white, stigma lobes purplish violet.

I see that Albert Buining found specimens of *caespitosus* with both shining white and yellowish-white spines. This tallies with the variation of spine colour in my group of plants but perhaps I can go further than Mhr. Buining to recommend that *N. tenuicylindricus* should be made synonymous with *caespitosus* and *minimus*.

I possess four similar plants in this group as follows:-

- a) *caespitosus* - grafted - ex. Chileans
- b) *minimus* - own roots - ex Uhlig
- c) *minimus* - grafted - ex Uebelmann
- d) *tenuicylindricus* - own roots - ex Uebelmann

and below are tabled their comparative descriptions:

	(a)	(b)	(c)	(d)
Height	3.7 cm	3.3 cm	4.8 cm	7.6 cm (since reduced to 2.5 to save from rot)
Diameter	2.2 cm	2.0 cm	3.2 cm	2.2 cm
No. of ribs	14	12	14	15
Spiral	slightly	straight	straight	straight
Areoles	3-4 mm apart	3-4 mm	2 mm	3-4 mm

in all cases the areoles are slightly tilted back into small notch and are approx. 2-3 mm in size with whitish wool.

Radial spines	13 3-4 mm long yellow-white	9-11 2-3 mm long white	15-16 2-3 mm long white tipped red	12-13 3-4 mm long yellowish-white
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not particularly adpressed but parallel to body spreading evenly in most cases.

	(a)	(b)	(c)	(d)
Central spines	3-4, occ. 1 3-9 mm long at least one hooked deep red	1-2 2-4 mm long mostly all hooked deep red	3-4 3-10 mm long lower one hooked deep red	2-3 4-9 mm long occasional one very slightly hooked deep red
Flower	from top upper side - buds with whitish wool, petals lemon yellow, lanceolate with feathery tips 5.5 cm dia.	none yet	buds with dense brown wool appeared in late Sept. on top upper side. No flowers yet.	buds with white wool appeared from top upper side, petals lemon yellow with slight feathery tips. 6 cm dia.
Stigma	bright red 8, 12 lobes	-	-	Watery red with 10 lobes

It is quite obvious that *Notocactus caespitosus* will have to be redescribed with a broader description.

..... from H. Middleditch.

My plant of *N. caespitosus* is grafted on a diminutive stock of *Trichocereus*. The scion is now getting on for 2½" high and has started to produce two or three small offsets from the base. It flowered in 1968 and in 1969 but whenever the flowers were open I was unable to be at home so was unable to find out precisely what they looked like; except that even when half-closed the flower seemed to be rather floppy.

A most striking feature which I was able to observe was the stigma, which was an outstandingly brilliant red in colour - quite different in colour from any other stigma I can recollect seeing on any other cactus. I counted fourteen lobes on the stigma, which was only just clear of the anthers. The flower tube was about 1.5 cm high, the upper 10 mm being yellow while the lower 5 mm was green. This was covered with a fairly thick coating of wool, through which projected numerous bristles. The wool at the base of the tube was white and over the upper part of the tube it was pale brown - this being the colour of the wool which covered the bud in its early stages. The bristles were reddish brown - similar in colour to the spines on the plant body.

While inspecting the plant fairly closely this year I observed that, at the most recent flowering areole, the hooked spine and the other spines were almost twice the length of the spines on a non-flowering areole. A further close examination of each other areole which had also flowered revealed that those, too, carried spines very much longer than the remainder. Presumably this is a similar effect to that at the flowering areoles of *Borzicactus icosagonus* and *Cleistocactus (Cephalocleistocactus) ritterii*.

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

Notocactus caespitosus flower is as you supposed: large, with long, floppy petals, rather slender. The flower of *N. tenuicylindricus* is quite similar. This latter species also produces longer spines and a mat of greyish wool at the flowering areoles.

Any slides of this (these?) species will form a welcome addition to the slide library - A.W.C

NEOPORTERIANAE

Extracts from the English Robin - 2

..... from D.J. Lewis:

"Although I suppose we should really change the labels on our Chileorebutia to Thelocephala, my labels remain the same as I have called all my plants Neochilenia.

"I have five Thelocephala that could now be classed as old stagers, among which are two plants of *N. reichei* on their own roots, grown from Winter's seed. One produces more buds each year than it can handle and ends up with about five flowers; the other has yet to flower although both are of similar size. (Photos of these plants are in our slide library). These plants have short cylindrical bodies but the height does not increase much due to the basal part of the stem collapsing like a concertina each winter."

..... from G.W. Sykes:

"Looking at my slides of flowering *glabrescens*, *esmeraldana*, *duripulpa*, and two forms of *napina*, I find that the freely produced, usually yellowish, flowers are larger than the globular plants that bear them, *glabrescens* and *esmeraldana* particularly so. They last several days and flower intermittently throughout the season.

"I am inclined to agree that the grafted *esmeraldana*, seen so freely offsetting, may have originated from the same clone. Newly grafted offsets produce large broods themselves within a few months. This species will soon (if not already) be very common and, even though it is most attractive, will breed the contempt usually reserved for the ubiquitous windowsill *echinopsis*, etc.

"The only plant I have on its own roots in this group is a spiny *napina* (FR 249) which flowers just as profusely as grafted *napinas*. There would seem to be an interest in trying some of the freely offsetting species on their own roots just to see if they will remain globular and simple and to see if (in time) they will flower as well as when grafted".

..... from H. Middleditch:

"This year several more of my *Neochilenia* have flowered and produced fruit, initially in the form of a more or less round berry but rapidly elongating into a bright pink fruit. But *Pyrrhocactus dubius* set a fruit which remained round until ripe, about 1 cm dia., dark purple in colour with small pink-tipped scales. I would like to hear of any other species setting fruit like this".

..... from Mrs. L.E. McIntosh (New Zealand):

"The Robin arrived at a most opportune time for most of my *Thelocephala* are at present in bloom. The plants on their own roots have two flowers at the most out at one time, whereas the grafted plants are just a mass of flowers.

"My grafted *napina* with six offsets, originally a seedling from collected seeds, does not seem to fit the description most of you give. Both my plant on its own roots and that grafted on *Tricho. macrogonus* are a grey green with almost a white bloom, flat topped, the offsets at this stage disc like, the areoles are sunken, with very little wool, only radial spines, matt black, about ½ cm long. The bud wool is a dirty biscuit colour with a few black bristles, the flowers creamy yellow with perhaps a slight tinge of green - eleven flowers open on the main body and 5 or 6 on each of the pups.

"My *reichei* is an offset from a collected plant, which is on its own roots. The parent plant filled a 5" pot with stems 3" to 5" long and at the most 1" thick, the areoles minute and very close, the spines a pinky beige colour perhaps 1 mm long, adpressed and interwoven. My own plant is grafted and much larger but still single headed, about three times as tall as it is broad, showing

a little of the greeny brown body colour, with the new spines at the top quite yellow.

"The climate at Hawkes Bay is just right for cacti - longer daylight hours in winter with cool nights and some frosts, whilst in summer the days are at tropical temperature with cool nights".

We have a fairly broad selection of Neoporteriae species in the slide library - A.W.C.

OROYA Britton & Rose by A. Govaert.

(Translated by H. Middleditch from *Dodoneus* 4, 1 : 1966)

A very interesting genus recently becoming more widely known. For a considerable period it remained monotypic. Moreover, one knew only of some rare specimens which were the pride of some informed amateurs.

Most happily, Rauh and Ritter have discovered other species in the course of their expeditions of late years which has allowed several collectors to carry out the first seed-sowings. One must also mention the many specimens which Rauh sent to Europe where they have become very well acclimatised in our nurseries.

The type species of the genus is obviously the first to be described - *Oroya peruviana*. There are in Belgium numerous examples named incorrectly for they almost all originated from seeds sold by the firm Winter about the years 1958 - 59, which were not, in fact, the true peruvianus and, on this matter, I would like to suggest they be renamed *Oroya neoperuviana*.

Oroya peruviana has a dark epidermis and was considered as having been lost up to this year. The few examples existing in European collections were jealously guarded by their owners who refused to part with them, no matter what the price. Moreover, if by a miracle, one succeeded in obtaining a small piece, it would more than likely be nothing but a reject. Fortunately, several examples have been rediscovered last year (1965) in habitat, the seeds of which have been sown by Mr. Andrea.

Weberbauer discovered this species in 1903 and K. Schumann provided the description, but since that date no other expedition has found further specimens. To crown the misfortune, the original plant deposited at the museum of Berlin Dahlem was destroyed at the same time as the museum during the last war with the result that any comparison has become impossible.

The genus *Oroya* occupies a place in the taxonomy of the Cactaceae which differs according to the author, but which in no way detracts from the interest of many amateurs in spite of the fact that there is practically no means of making it flower. Given that one comes across plants between 3,500 and 4,000 metres altitude (11,000 - 12,500 ft.), it is likely that it suffers in our collections from a lack of intensity of light.

Other than that, its cultivation does not pose any special problem. In habitat, it endures very low temperatures and a high level of humidity. During some months, some fresh snow falls each day which melts in the morning sun, but at high noon the clouds heap up once more and are invariably the cause of a new shower of snow or of hail. During the summer it is not uncommon for some months to pass without a drop of water, nor the slightest mist. In general the range of temperature easily reaches 45°C between day and night.

Rauh has published a study of the growing conditions for Peruvian cacti - "Beitrag zur Kenntnis der peruvianischen Kakteenvegetation", whence I abstract the information presented in the table below:-

	<u>Temperature °C</u>	<u>Soil Surface Temperature</u>	<u>Relative Humidity</u>
24.00 hrs	- 1	- 3	86.5%
06.00 hrs	+ 1	- 6	74 %
12.00 hrs	+ 10	+ 40	51 %
18.00 hrs	0	+ 2	73 %

Between 18.00 and 24.00 hours, relative humidity remained in the neighbourhood of 100% which then precipitated in the form of mist, but it is not uncommon for the humidity to drop as low as 40% and the plants must, in addition, endure a dry and bitter wind. The men who live in this territory suffer continually from thirst and it is not uncommon for their nails and their hair to become brittle and for their skin to crack. To survive these rigours, it is certain that these plants which are well adapted to an extreme environment could not fail to adapt themselves to the less harsh conditions of life which they encounter in our collections.

The Oroyas are globular plants which hardly ever exceed 25 cm in diameter growing on very slowly on their own roots and are of a sort which it would seem logical to graft on to strong stocks: *Trichocereus lamprochlorus* and *spachianus* and *Eriocereus jusbertii* have given me excellent results. Unfortunately, in each case, the grafts lost their fine globular appeal and have tended to elongate somewhat.

If one has the opportunity of obtaining an imported plant one should not fail to grasp the chance - as was the case recently when the firm of Uhlig at Stuttgart offered *Oroya laxiareolata*. I grant that the price asked might well appear excessive at first sight, but I believe that these very rare specimens are indeed really worth their price.

The species of this genus flower in the main in a range of red colours, but also in yellow as is the case with *Oroya borchersii*. It would also be agreed that the different species are well differentiated and that there is no evidence for concern about hybrids, the habitat locations of the different species being very far removed from each other. To repeat, the type species of the genus is *Oroya peruviana*, but there is also:-

Oroya neoperuviana Backbg. which one comes across upon the chalky soils among the puna grass. Its spines can have different colorations and it can reach 20 cm in diameter and 30 cm in height. Backeberg has taken the pretext of the diversity of spine colouration to create the variety *ferruginea*, Rauh and Backeberg which, as its name indicates, has rust-coloured spines and is a little larger than the type while its flowers are smaller. Variety *depressa* Rauh and Backbg., of a more flattened or depressed form which does not exceed 10 cm in height and has more tendency to branch. The spines are a little stronger and the radial spines slightly overlapping.

Oroya laxiareolata Rauh & Backbg. in which the areoles are very elongated compared with other species - up to 4 cm: species more dwarf of which the diameter does not exceed 10 cm and the height 15 cm.

Natural habitat: valley of the Mantaro at 3,700 m altitude.

Oroya suboculta Rauh & Backbg. Globular body slightly flattened 20 cm dia. and 15 cm high. Lateral spines overlapping, very numerous and completely surrounding the body of the plant. Variety *albispina* has more pronounced ribs, white lateral spines, more robust, quite transparent, base reddish or brownish black. Variety *fusca* has a body similar to the preceding, but with larger ribs. Lateral spines much shorter and consequently with less overlapping.

Oroya borchersii (Boed) Backbg. One of the finest Oroyas, strong spines, half-shiny, which entirely cover the globular body. In full sun they take on a metallic sheen which makes a truly resplendent plant. Flowers citron yellow. Variety *fuscata*, Rauh & Backbg., spines even

denser, flowers greenish yellow; branches quite readily.

Oroya gibbosa Ritter n.n. forms the latest addition to the genus. No further description is available. It has flowered last year in my collection with flowers characteristic of the genus. Few spines, many-cornered areoles strongly predominate. Many authors in discussion declare "flowers unknown". Given the reddish tinge which they have with me, I presume that they belong to the peruviana group.

Furthermore, one comes across in certain Dutch and Belgian collections a type named *Oroya peruviana* type Buining. Personally I have the impression that it could be a hybrid between *O. peruviana* and *O. gibbosa*, but I would agree that it is well worthy of interest.

We have slides of *O. peruviana* and *O. borchersii* available from the slide library. Any slides of plants in this genus will be very welcome - A.W.C.

OROYA

Comments by J.D. Donald.

In the three years that has passed since Mr. Govaert wrote his article for *Dodonaeus*, plants have become even more readily available either as seedlings or imported plants, and it is not difficult now to have a completely representative collection of all the described species and varieties. In the last year particularly fine specimens covering a whole range of variations of individual species have been available in this country and on the continent, so one is not restricted to just collecting the named species and varieties alone. A collection of the variations that occur naturally in each species is certainly an eye-opener to those who like their plants to conform to the original descriptions. The precision-minded would require at least 20 more names to cover the major variations now known, but happily there seems no likelihood of this happening. Instead an opposite trend is more probable with a reduction in the number of existing species. While I do not go the whole way with Myron Kimnach in his revision of the *Borzicactus* group, I nevertheless have much sympathy with his contention that it consists of one highly variable species only - *O. peruviana*, and that all the recent new species are only variants of it. Kimnach uses the words "trivial variants" - my quarrel is with the word trivial - in my opinion several of the new species would make good varieties of *O. peruviana*.

The genus *Oroya* is in some ways a difficult genus to place in the cactus hierarchy. It has only a limited distribution in Peru, from the southern borders of the Department of Pasco, through Jurin (*Oroya*), Huancavelica, Ayacucho, to northern Apurimac, in a narrow belt of highland between 3,000 and 4,000 m over a distance of some 300 miles as the crow flies. This area occurs within the distribution zone of *Borzicactus* sensu Kimnach in Peru (*Matucana*, *Submatucana*, *Arequipa*, *Loxanthocereus*, *Morawetzia*, etc.). While it is not easy to compare the strictly flattened globose *Oroya* with the cerioid *Morawetzia*, or subcerioid *Arequipa* or *Loxanthocereus* on external morphology, it is perhaps easier to do so with *Matucana* and especially *Submatucana* which are less strongly armed than the true *Matucanas*. On the other hand, the flower of an *Oroya* is very different from those of the other *Borzicactinae*, being short and campanulate and actinomorphic whereas the others are long, tubular or funneliform and almost invariable zygomorphic. This characteristic flower of the *Oroya* goes a long way to justifying its separate specific status from, say, *Matucana*. Backeberg on external morphological grounds considered *Oroya* to be allied to *Parodia* or *Gymnocalycium* but the more detailed studies particularly of the internal floral structure and that of the seed, by Prof. F. Buxbaum, suggest that its allies are those genera with which it is conspecific in the *Borzicactinae*. In this I am in entire agreement with him and Myron Kimnach.

The areole of an Oroya is an easily distinguishable feature being - in contrast to most of the Borzicactinae - very long and narrow and bearing pectinate lateral spines: only some species of Submatucana and Matucana approach this type of areole and even then the length/breadth ratios rarely exceed 3 : 1 whereas in the Oroya it is commonly 5 : 1 and even more in many instances.

The type species of Oroya, *O. peruviana*, as Mr. Govaert explains, was probably lost to cultivation and some doubt has been expressed as to whether it has been recollected. Backeberg was correct in observing that plants cultivated on the continent did not readily match the original description of Karl Schumann in a literal sense, but it is doubtful whether the differences he noted were worthy of separate specific status for these plants. The vast majority of imports and seedlings raised from the Ritter expeditions and later from those of Prof. Rauh and even more recently of Dr. Alfred Lau, certainly agree more closely with Backeberg's description of neoperuviana than with Karl Schumann's peruviana. But the trouble really lies in the paucity of Schumann's description - it would seem that we might be in danger of taking for granted that because Schumann did not mention certain features, that they were not there on the plants he examined. It seems strange that the plants as he described them have not been re-collected - or have they, under another name? I believe that this is possibly so and this might have obscured the issue.

Ritter's FR 143a *Oroya gibbosa* is, I suspect, the original *Echinocactus peruvianus* of Karl Schumann - as Backeberg suggests in *Das Kakteenlexikon*; in which case there is clearly a recognisable external difference in the appearance of *Oroya peruviana* and *Oroya neoperuviana*, and this could possibly account for some of the omissions in Schumann's description of the original plant, but this is by no means conclusive evidence that Schumann only knew one of these two plants. Schumann's description in reality contains the essential basic characters of both plants and in the absence of any positive evidence from Schumann to separate peruviana and neoperuviana, it seems unwise to create a new species. The only difference seems to be in the spination; peruviana has relatively fewer and stronger radials and more centrals than neoperuviana. The spines of neoperuviana are much finer and more pectinate than for peruviana. The flowers are identical. *Oroya gibbosa* has even fewer spines, hardly pectinate at all, and stiff whereas in neoperuviana they are quite flexible. The flower of *O. gibbosa* is also quite indistinguishable from that of *Oroya neoperuviana*. If one averaged the general characteristics of *Oroya gibbosa* with those of *O. neoperuviana*, one would get a set of characters that would match those in the original description given by Schumann for his *Echinocactus peruvianus*.

Oroyas are rather shy in flowering, particularly in northern Europe and it has been suggested that it is a combination of lack of sunlight with warm nights during the flowering season. This may well be the case. *Oroya gibbosa* appears to be the easiest to flower, with neoperuviana next, but *borchesii*, *subocculata* and *laxiareolata* rarely in cultivation. I myself have never succeeded in flowering any *borchesii* or *subocculata*. I do believe that seedlings are more likely to flower than imported plants.

O. peruviana, neoperuviana and gibbosa have exactly the same flower - a bicolor or tricolor affair of yellow, orange and red. Buds are invariably pink at first. *Laxiareolata* can be either pure yellow or yellow with red margins and tips. Flowers normally occur near the umbo in a ring or just a spontaneous one or two on the shoulders.

Despite the fact that they do not flower easily, the plants themselves are very beautiful with their very regular spination in all colours from pure white, to yellow, rich golden, red, through dark crimson to almost black, each plant having its own special colour.

Reference: A revision of *Borzicactus* Myron Kimnack C & S. J. Amer. XXXII 1960 pp 8-13, 57-60, 92-96, 109-112.

..... Comments from H. Middleditch.

My first plant of Oroya was acquired more or less by chance during our Tour to Belgium in 1965; at that time I knew little or nothing about Oroya but I suspected they might be difficult

to cultivate so I did not select any of this genus from those available. However, when it came to paying for our acquisitions my total came out to an odd figure and one or two more plants were added by our host to make it up to a round figure.

Having potted up my chance acquisition at home I proceeded to give it rather less water than other plants in the belief that it might pass out on me; however, in the course of time I forgot to be so scrimping with the water and the plant grew much better. Having discovered that there did not seem to be any outstanding difficulty with this plant, I acquired one or two others, including one on its own roots. This latter certainly grew much more slowly than the remainder, which were grafted, but during the winter of 1968-69 I was much more generous than usual with water and this own-rooted plant would receive a goodly share, so that it probably did not dry out at all for the winter. This could account for it having about doubled its size from last spring to this summer, much to the disgust of a local collector whose carefully nursed seven year old seedling remained pea-size in comparison.

During our 1967 Tour to the Riviera we came across *Oroya* in bud and flower at both Delrou's at Menton and in the collection of Marnier-Lapostolle at Les Cedres. Those buds which we saw then were a distinct red in colour right from their first appearance, rather like *Neoporteria sensu stricta*; all the flowers seen were orange and red, rather reminiscent of the tricoloured flowers on *Lobivia pentlandii*.

PLANTS AT HIGH ALTITUDE

Plants like *Oroya* which grow at high altitudes encounter climatic conditions markedly different from those growing at low or less elevated altitudes.

Even the air itself is not quite the same for there is a change in air density which occurs with altitude; we find that a barometer reading of 30" at sea level will become 20" at 10,600 ft. solely due to the decrease in air density with an increase in altitude. This "thinning" of the air can have a serious affect on human beings who are acclimatised to low-altitude environments; the reduction in oxygen intake adversely affects normal bodily functions and often results in "mountain sickness".

The air at high altitudes is not only less dense, it is also a great deal clearer so that objects a great distance away can be seen with remarkable clarity. This clearness of the air is due to two factors - first the markedly small amount of dust in the air and secondly the similarly slight amount of water vapour in the air. The small amount of dust in the air at higher altitudes can be accounted for by the fact that all airborne dust is generated at ground level and in 'thin' air at high altitude the dust can settle quicker. The 'thinner' air also holds less water vapour, added to which any air which has risen from lower altitudes will - for most of the year - have already parted company with most of the moisture it carried. Winds traversing the high mountains will have precious little opportunity to pick up moisture from the barren surfaces. Thus on both these accounts less water vapour is to be found in the air compared with sea level.

The very nature of the sun's rays reaching the surface at high altitude is also different. It is the short-wave rays at the violet end of the spectrum which are most readily absorbed by the atmosphere around the earth and the red end of the spectrum is least absorbed by the atmosphere. This results in a markedly higher proportion of ultra-violet rays reaching the surface of a mountain - about twice as much at 5,500 ft. altitude as at sea level and half as much again at 10,000 ft. altitude.

The earth's atmosphere is warmed not so much by the passage through it of the rays of the sun, as by the heating of the dust and water vapour in the air which then warms the air around each particle by contact. Because of the greatly reduced amount of dust and water vapour in the air at high altitudes, very little of the sun's heat is abstracted by the air which in consequence remains

cool; indeed a fairly constant relationship can be stated for the amount by which the air temperature will drop for a given increase in altitude.

In contrast to the coolness of the air, the sun's rays are able to pass freely through the cool, clear air and beat fiercely on any solid object, be it rocks, plants, or human beings. The combined effect of a burning sun, rich in ultra-violet light, and a keen cool wind is to burn the exposed skin on hands and face of human beings and to crack the burnt skin, all in a manner quite unlike the soft tan of low altitudes. Rocks are rapidly heated up to a surprising high temperature so that they are painful to touch. The ground remaining in the shade continues to be at the same temperature as the cool air, so that a remarkable difference exists between the temperature of the ground in the shade and that exposed to the full glare of the sun.

At night the land can radiate its heat away freely; at lower altitudes the denser air and especially the clouds have a blanketing effect which retards loss of heat from the ground during the night, but the clear air at high altitude together with the virtual absence of clouds offers no check to the loss of heat by radiation. The temperature of the ground falls to a very low level during the night. Thus on ground exposed to the burning sun during the day and free to lose its heat at night, there is a tremendous diurnal temperature range.

Whilst the air is slow to heat up during the day and remains cooler than the ground in the sun, at night time the air is slow to lose its heat. Indeed there is very little change in air temperature some distance above ground level between day and night. The air is cooler than the ground in the sun during the day, and at night it is warmer than the ground itself.

The air in immediate contact with the ground will be warmed by contact with the ground during the day and cooled during the night. In day time the warmed air next to the ground will try to rise so that on a slope exposed to the sun an uphill wind will be established. Valleys of a width and depth such that both sides are in the sun, and especially those orientated north-south, have a characteristic afternoon uphill wind. At night time the cold air next to the ground will tend to flow downhill and collect in valley bottoms and in hollows, so that severe frost will occur in 'sheltered' locations.

It will be clear from the above that plants growing at high altitudes have to resist much severer climatic conditions than those growing in the worst low-altitude conditions - such as the inland plains of the southern Chaco and Salinas Grandes. One expects that plants will avoid frost hollows and would prefer sloping ground and that small plants would avoid ground where there is not even the slightest shade from the fierce sun and might prefer the company of shrubs or grasses. It is unfortunate that collectors who have travelled in these cacti habitats have recorded so little detail of the growing spots where plants are found and which presumably afford the best inherent defence against the elements.

It is easy to see that the woolly coat on the high-altitude *Euphorbia* and *Oreocereus* is designed to absorb the fierce heat of the sun's rays before it reaches the epidermis, in order to minimise transpiration, and also to enmesh air which will lose heat during the hours of darkness more slowly than the general atmosphere; so insulating the plant to some degree-like a string vest - from both the drying and scorching effect of the brilliant sun by day the damaging chill of the night. Likewise one finds *Muhlenbergia* referring to '*Trichocereus pasacana* close to the pass ... at 4,200 m ... are snow-white haired. Lower down they lose the hair more and more until at 1,800 m they are completely hairless at the areole but bear fierce long spines'.

It is hardly surprising that imported specimens of *Oroya* carry an array of spines which are so dense as to form a defence against the searing rays of the sun, whilst in cultivation the growth is far more open since the rays of the sun are far less powerful at lower altitude and higher latitudes.

H.M.

FRAILEA

Extracts from the Robin:

The Frailea Robin has now completed its first round and contained a description and discussion of 30 species.

Of particular interest, Dr. Hrabec writes from Czechoslovakia that *Frailea columbiana* and *Fr. pumila* are synonymous and that the old maxim of *Fr. columbiana* having larger flowers than *Fr. pumila* is not correct, as flower size can vary in both species. It was also suggested that *Fr. pseudograhliana* (Fric 1934) and *Fr. pseudopulcherrima* were synonymous.

Two types of *Fr. schilinzkyana* (Hge jnr. 1897) were described, one having a light green epidermis and large flowers and the second having a dark green epidermis and small flowers. However, both types of plant produced identical seed.

Plants of *Fr. knippeliana* (Quehl. 1902) at present in collections apparently bear little resemblance to the original description and it is generally believed that this plant no longer exists in European collections.

Frailea pulchella came in for some criticism, as it would appear to be synonymous with *Fr. columbiana* / *pumila*.

Recent introductions discussed were:

Fr. chrysacantha, a small globular plant like *Fr. aurea* but with rough rusty brown spines and rust coloured bristles on the fruit.

Fr. HU 65 was described as being spherical with a greyish green epidermis and a depressed crown. The brown spines emerged from brownish areoles and had reddish tips.

Fr. HU 75 is globular with a deeply depressed crown and 22 ribs. The areoles are dark brown and felty. The minute straw coloured spines all pressed against the body of the plant and it has dark centrals.

Fr. horstii, HU 13, is a most attractive plant having two forms, one with brown and the other with white spines. The plant is relatively tall and cylindrical with a dark green epidermis below the dense covering of spines.

Fr. uhligiana from Bolivia is globular with a green epidermis at the centre changing to red-brown towards the base. The body is almost completely smooth and the very small spines almost insignificant.

Fr. albifusca FR 1392 is a tall cylindrical plant with 14 ribs, pale grey spines and a deep green epidermis. It does not have a depressed crown and has a dark crescent mark below each areole like *Fr. cataphracta*.

Fr. sp. Uruguay is spherical with a dark greyish green epidermis and a depressed crown which is very spiny. It has 16 ribs and bare pale brown areoles from which grow the brown, twisty, pectinate spines.

Fr. sp. Paraguay has a broad depressed crown and has 17 ribs. The yellow spines are flattened against the plant which throws out several offsets.

It appeared that members are trying many of the new species which, being different from the species usually found in collections, were creating great interest. An example being when a friend visited my collection saw *Fr. horstii* for the first time and exclaimed that it was surely a small *Cleistocactus strausii*!

I welcome anyone interested in this unusual genus to write and contact me.

J. Forrest

FRAILEA SEED

The accompanying sketches from D.J.Lewis are of seeds of *Frailea* all of which (with the exception of No.5) were obtained from the Austrian Cactus Society seed distribution for 1969. The seed illustrated is of the following species:-

- | | |
|--|---------------------------------|
| 1. <i>Fr. columbiana</i> | 7. <i>Fr. pseudopulcherrima</i> |
| 2. <i>Fr. pygmaea</i> | 8. <i>Fr. pulcherrima</i> |
| 3. <i>Fr. pumila</i> | 9. <i>Fr. alacriportana</i> |
| 4. <i>Fr. grahliana</i> | 10. <i>Fr. gracillima</i> |
| 5. <i>Fr. pygmaea</i> v. <i>phaeodisca</i> | 11. <i>Fr. cataphracta</i> |
| 6. <i>Fr. schilinzkyana</i> | 12. <i>Fr. horstii</i> |

It was noticed when examining the seeds closely that there was quite a range of seed form within each species or variety. In consequence it is rather interesting to compare these sketches with those included in Backeberg's *Kakteenlexikon*, Abb.123. Both sources show the seed of *Fr. columbiana* of similar form - the seed is taller than it is broad and the hilum is cut off at about 45° to the vertical axis of the seed.

The seed of *Fr. pumila* also compares very well between both sources, the hilum following a sharp bend when viewed in elevation - this can be seen from the nearside hilum edge in the accompanying sketch. Whereas it seems most unlikely that *Fr. columbiana* can stand as a valid species, it seems a remarkable coincidence that this difference in seed shape should have been picked up by two quite independent sources, if *Fr. columbiana* and *pumila* are indeed synonymous.

There is very considerable difference between the sketches of the seed of *Fr. pygmaea*; whereas our example has characteristics generally similar to *columbiana*, the sketch in the *Lexicon* shows a seed broader on one axis only than it is high, with the hilum more or less square to the vertical axis of the seed. The *Fr. pygmaea* v. *phaeodisca* shown in the accompanying plate as No.5 would seem to be more typical for the shape of the seed of this species and varieties.

The seed of *Fr. grahliana* are shown to be similar in form in both plates - the 'columbiana' type of seed.

There is an appreciable difference between the two sources for the form shown of the seed of *Fr. schilinzkyana*; in comparison with the accompanying sketch, Backeberg has shown a seed broader over one axis than it is high and with the hilum slightly angled to the vertical axis of the seed - similar to *phaeodisca*.

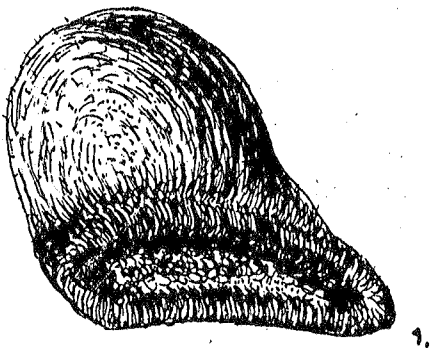
Backeberg illustrates two seed forms of *pseudopulcherrima* - both generally of the 'columbiana' sort, one with a curved-down tail to the hilum as shown in No. 3 herewith and one with a much less pronounced curve in the hilum - this latter comparing very closely in all particulars with that shown in No.7 herewith.

We might expect some discrepancies with *Fr. pulcherrima* seed, but both sources show a seed basically of the 'columbiana' sort with a curved hilum; Backeberg shows the seed appreciably larger than *pumila* and *columbiana*, however.

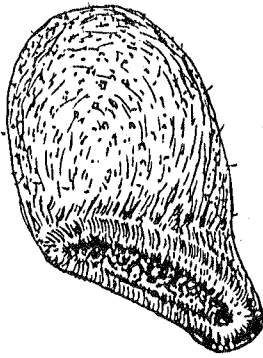
Backeberg illustrates three forms of seed for *alacriportana*, but all with the following characteristics in common: about as broad as high, hilum more or less square to the vertical axis, seed large. One of the forms illustrated by Backeberg has the hilum protruding to one side, as shown on the accompanying sketch at No.9.

The seeds shown for *Fr. gracillima* compare favourably in both cases.

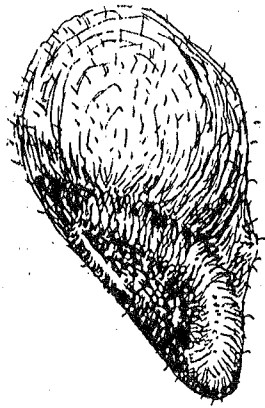
Both examples of *Fr. cataphracta* seed show the breadth of the hilum to be greater than the vertical height, but whereas our sketch shows only a slight difference, Backeberg shows a seed only half as high as it is broad.



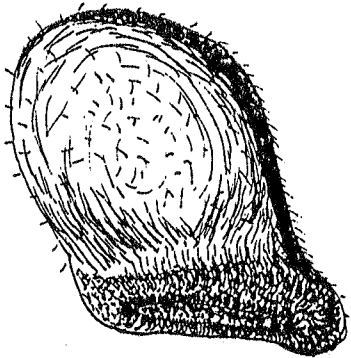
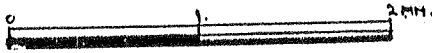
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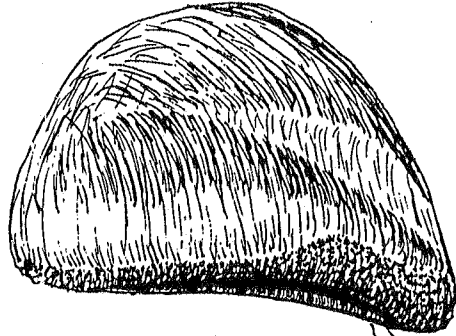
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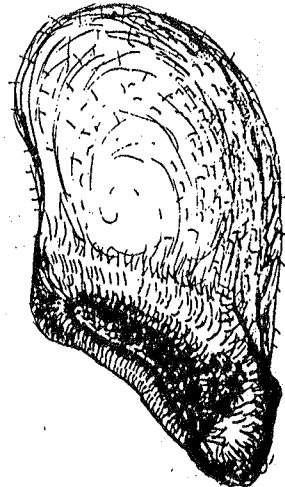
3.



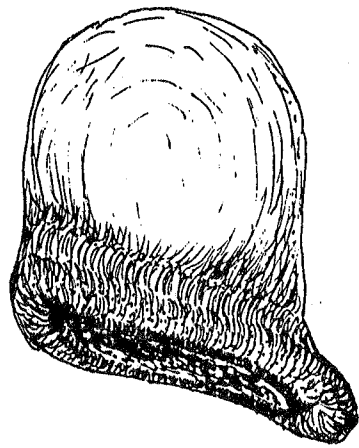
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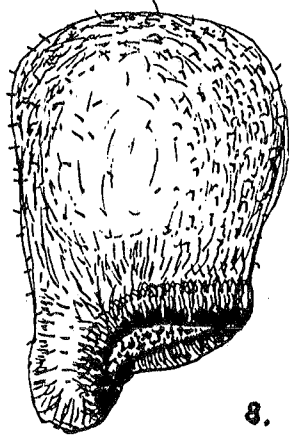
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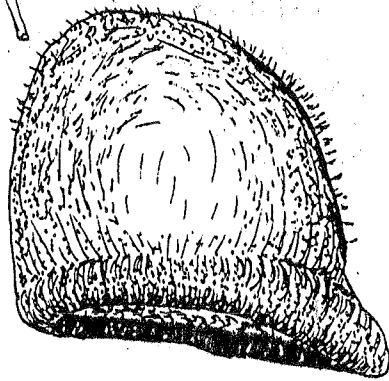
6.



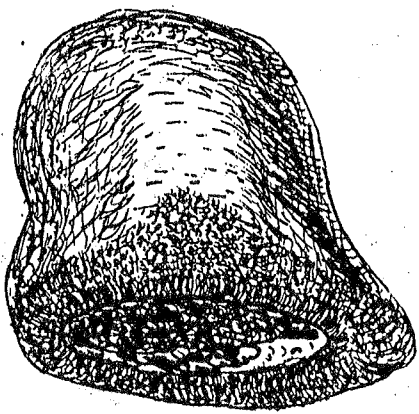
7.



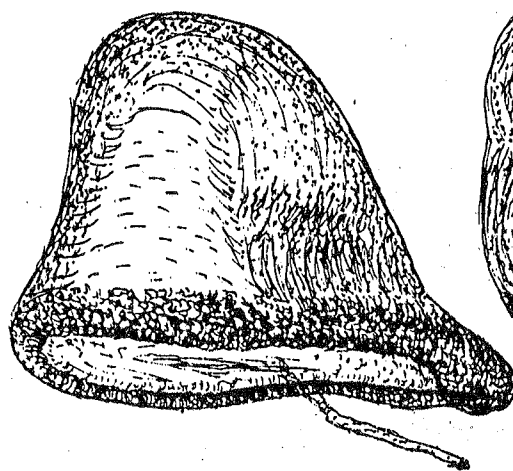
8.



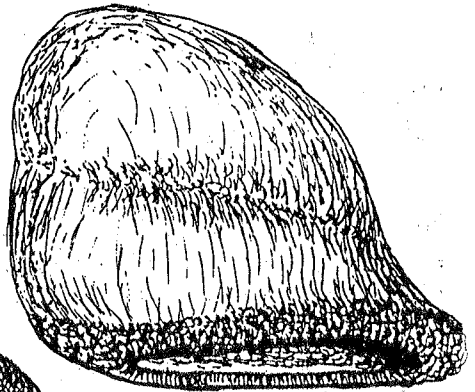
9.



10.



11.



FRAILEA SEED.

Whether the differences which have been noted above are due to the wide range of variation in seed form - or whether it is due to harvesting seed from plants labelled incorrectly - can best be determined by examining a larger number of seed samples. In view of the ease with which these plants set seed we would hope that as many of you as possible would send in seed for comparison purposes. This may be sent either to the Frailea Robin leader or - if it is more convenient to send it in one package with other seed - to the seed exchange.

H.M.

The current list of Frailea species includes some recent names, as follows:-

FR. <i>alacriportana</i>	<i>pulcherrima</i>
<i>albifusca</i> FR 1392	<i>pullispina</i>
<i>asperispina</i> FR 1365, HU 55	& v. <i>atrispina</i>
<i>carminifilamentosa</i>	& v. <i>centrispina</i>
& v. <i>winkelmaniana</i>	<i>pumila</i>
<i>castanae</i> = <i>asterioides</i>	<i>pygmaea</i>
<i>cataphracta</i>	& v. <i>altigibbera</i> FR 1370a
<i>cataphractoides</i>	& v. <i>atrusca</i>
<i>chiquitana</i>	& v. <i>aurea</i>
<i>chrysacantha</i>	& v. <i>dadakii</i>
<i>columbiana</i>	& v. <i>lilalunula</i> FR 1385b
<i>gracillima</i>	& v. <i>longispina</i> FR 1369
<i>grahliana</i>	& v. <i>paucicostata</i> FR 1366
<i>horstii</i> FR 1353, HU 13	& v. <i>major</i> HU 12
<i>knippeliana</i>	& v. <i>phaeodisca</i> HU 75
<i>paraguayensis</i>	<i>schilizkyana</i>
<i>perumbilicata</i>	<i>uhligiana</i>
& v. <i>spinosior</i> FR 1385c	<i>uruguayensis</i> U 2296
<i>pseudograhliana</i>	HU 65, HU 66, HU 67, HU 83
<i>pseudopulcherrima</i>	HU 88, HU 89, HU 99, HU 177
<i>pulchella</i>	HU 178, HU 303, HU 315, HU 322.

We have a few slides of Frailea available in our slide library. Any further slides of Frailea plants - especially in flower or fruit - would be very welcome - A.W.C.

OBSERVATIONS OF BLOSSFELDIAS BY REV. UDO KOHLER

(Translated by E.W. Bentley from "Kakteen und andere Sukkulente" January 1966).

Notwithstanding the comprehensive account by Messrs. Fehser, Kilian and Andreae of Blossfeldia culture in "Kakteen und andere Sukkulente" 1962 p. 82 may I make a few observations here about Blossfeldia flowering.

Under the number 1000 I grow *Blossfeldia liliputana* Werd. I bought my plant, grafted onto *Cereus spachianus*, from Herr Andreae of Bensheim. Through lack of cultivation know-how I have not been able to flower a similar plant (imported on its own roots) bought from Herr Uhlig of Rommelshausen. I received a third plant from Herr Kilian of Mainz-Kostheim from the University of Mainz propagation. This plant however has not flowered for me although it has been kept under the same conditions and is about the same size as the Andreae plant. The plant from Herr Andreae, which stems from a time when other species were not known, made offsets without mechanical assistance. A piece grafted on *Pereskiaopsis velutina* grew strongly and became corky

at the base without offsetting, and in the second year put out an offset through the corky base and another near the crown. The flower of the *Andreae liliputana* is cream/white, the fruit has olive-green scales especially on the upper edge, but not equally distributed, the style is cream, the filaments are yellow, the flower tubular, opening a little only in full sun. The fruit is thick, rounded, the bud has a recognisable stalk at the base which is scarcely recognisable in the full flower. The flower of this plant does not comply with Castellanos' description 'wide-opening'. The olive-reddish fruit dries to a grey-brown shell which contains about 50 small smooth seeds with large grey-white hilums. The tubular flower opens only for a few hours around midday in full sun: if the sun is lacking, the bud recedes and dries up. The plant is self-fertile and presumably cleistogamous. Other simultaneously flowering species of the genus Blossfeldia open quite wide for hours, while here the flower of the tubular to weakly opening form doesn't come out (with the same cultural treatment and weather).

The plant obtained from Herr Kilian very much resembles in appearance the plant pictured in "Sukkulentenkunde" III (1949) p.32 and has fluffy, separated areoles (not in ribbons) with a white-woolly crown. Attempts to root stray heads separated from the parent plant failed in that they shrivelled and dried up, while Rebutia offsets of similar size rooted up. The flowers arise centrally or at any rate near the crown. Since the plant from Herr Kilian hasn't flowered yet it may be that we have here at present under the name Blossfeldia liliputana Werd one of Blossfeldia campaniflora Bckbg. like imports, since this difference cannot yet be stated.

Under No.1001 I grow Blossfeldia campanuliflora Bckbg. I obtained the plant as an import on its own roots from Herr Uhlig of Rommelshausen. The plant is sprouting at the base and near the crown (in the latter case through bud metamorphosis?) so that it is forming a clump. The flowers agree with the Backeberg description in "Die Cactaceae" III, p.1668 et seq. and open into a bell-shape and so are wider than in No.1000. Although it seems to be self-fertile, seeds have not yet been harvested. The flower opens more freely and for longer than No.1000 and does not have such pronounced external olive-green median stripes on the perianth petals. The form of the areole is no different from plant No.1000.

Under the number 1002 I grow the yet undescribed Blossfeldia cyathiformis, found by F. Ritter, distinguished from Blossfeldia liliputana by the more concave disc (through dryness!) My plant I got as a farthing-sized self-rooted import from Herr Kilian of Mainz-Kostheim. The bud is stalked at the base, the light yellow flower opens like No.1001, has on the outside of the perianth petals a dark stripe, is self-fertile, sets fruit easily and produces seeds. I have not yet tested the germinative potential. The fruit is olive-green, round, becoming lighter at the base at ripening. The areoles protrude very little - or are even slightly sunken. C. Backeberg considers this species identical with his Blossfeldia campaniflora.

Under No.1004 I grow Blossfeldia atroviridis n.n. Fr. Ritter. (Mistakenly the name "atrovirens" has also been given to it). I got it from Herr Ritter via Herr Simon of Hilden. It is the show-piece of my Blossfeldias because it fulfils everything that one could wish for in a small cactus. It is grafted onto Cereus jusbertii which with a warm overwintering (about 10°C and a moderate humidity) proves to be an excellent stock. It has a more or less smooth dark-green body with sunken white-woolly areoles. The older areoles have lost the wool somewhat. The offsets sit up or bulge out from the depth of the body and recall the method of division of the crown in many cacti, although no proper division is taking place. The crown of the plant can be flat-round or concave, sunken in a crater shape - even without dry spells. The white flowers with 9 to 12 petals open freely and wide, even in not so strong sun, stay open two days and more, appear in such numbers that several are open together. With the stated overwintering conditions the plant flowers two to three times a year. The bud is olive-reddish, the pistil white, and the filaments yellow. The pistil is free, the flower clearly stalked. It resembles the flower of Blossfeldia minima that Herr Andreae pictures in "Kakteen u.a. Sukk." The fruit tapers off downwards. The plant is self-fertile and should therefore be a separate species at the earliest date. With artificial

pollination with their own pollen the flowers fall after withering. Herr Andreae seems to be successful at fruiting them; he offers seeds of this species in his list.

Under No.1005 I grow Blossfeldia pedicellata n.n. F.Ritter, which I got as an import on its own roots from Herr Uhlig of Rommelshausen but to be on the safe side I got grafted on Cereus nycticalus by Herr Gerards of Wesseling. The epidermis of this plant is dull, the areoles are white-felt-like and stand close to each other so that they form ribbons, the crown is correspondingly very white-woolly. The plant is growing slowly. The flower bud is strikingly dark red, doesn't open as wide as No.1004 but wider than all the others which perhaps caused Ritter at one time to describe the flowers (Winter's catalogue) as the 'biggest'. The perianth petals seem to be somewhat wider but in other respects correspond approximately to Castellanos' figure in Backeberg "Die Cactaceae" III. Fig.1601. The pistil, however, is white and the filaments are deep yellow. Ritter suggests that this plant should be kept damper. Herr Andreae offers seeds from this species. Presumably the plant is self-fruiting. Backeberg considers this species identical with Blossfeldia liliputana Werd.

My observations are intended to provide material for a better look at the genus Blossfeldia and to encourage interest in it. Also certain systematic questions might be cleared up. What is here only a variety and what is a true species?

I may mention that I may have another Blossfeldia liliputana? gathered as 'F3' by Herr Fechner, found at Olivos near Jujuy, self-rooted, flowering in the spring and autumn, obtained from Herr Kilian of Mainz-Kostheim. Under No.1007 I am growing Blossfeldia minima, as an import by Herr Uhlig - with its own roots - preserved by grafting onto Pereskiaopsis velutina by Herr Gerards of Wesseling. Herr Andreae has already reported on the regular flowering of this latter species in "Kakteen u.a. Sukk." 1962, p.83. This species, known as the smallest cactus in the world, could provide material for a novel if one recalls its discovery by Herr F.Ritter in America and its re-discovery in Germany by Frau H.Winter of Frankfurt-Fechenheim and its preservation by certain specialists.

Who will supplement or correct my observations?

SOME OBSERVATIONS ON BLOSSFELDIA.

..... from J.D. Donald:

I agree that grafted plants of B. liliputana tend to flower rather more freely than those on their own roots. I have also noticed that the flowers on the grafted plants are more vigorous and less prone to shrivel without opening on dull days.

All my plants have had nearly two years of acclimatisation and I find they are all very similar; personally I cannot readily distinguish them into their alleged separate species. I doubt if the specific status can be maintained for any of them. I could not quarrel with anyone who lumped the lot together. The trivial variations shown are not really worthy of taxonomic consideration at specific level. Maybe varietal status could be justified in two cases - for B. atroviridis and B. pedicillata.

Certainly I can see no difference between B. cyathiformis and B. campaniflora; the flower colour is more yellow than liliputana as Pastor Kohler says, but there is little to choose between all three in flower shape - all could be called funneliform or campanulate.

B. atroviridis is distinct in its vigour and rapidly forms many headed clumps or balls; it flowers very freely even on its own roots. The flower is very similar to liliputana but has several more perianth segments.

B. pedicillata is also quite distinct as Pastor Kohler says, particularly in that it is the most woolly in the crown and has a crimson flower bud - the flower itself is pinkish white like some forms of liliputana.

B. minima seems to be only a smaller edition of any of the others. Certainly it does not seem to want to grow individual heads as large as the normal forms of *liliputana*. This hardly merits specific status, when everything else is as for the type species! The fact that it is self-fertile is not of importance - in any case all the other species seem to be more or less self-fertile.

..... from R. Davison:

I have tried raising *Blossfeldia* from seed but I find that after two years they have only grown to about the size of match-head. I have one pot containing a plant of *Blossfeldia* which now also has some minute self-sown seedlings.

..... from D. Angus:

My *Blossfeldia* produces a vast quantity of very fine seed. I have tried sowing these and it is difficult to even see the seedlings after they have germinated.

..... from *Kakteen und andere Sukkulente* for December 1967, in an article by Udo Kohler:

"From a pre-occupation with *Blossfeldias* I came also to collect the most interesting *Fraileas*, which Kurt Backeberg put near together because species of both genera are autogamous and their seeds similarly papillate (warty) and the flowers are similarly placed near the crown (*Die Cactaceae* pp 1665-6.) Hans Krainz has then later (in *Die Kakteen*) put *Blossfeldias* under *Notocactaceae*".

..... from J. D. Donald:

I think that *Blossfeldia* will remain, at least for some time, as a genus - its nearest relatives are the *Parodias* of the *microseminae* group.

..... from R. E. Hollingsbee:

I have noticed it recommended that *Blossfeldias* should be grown in shady conditions. From my own observations of (admittedly few) grafted plants, I find that on *Harrisia jusbertii* stock my plant of *B. liliputana* v. *alba* grows very happily close to the glass shaded only by the single sheet of polythene lining the entire greenhouse which doubles as insulation in winter and to prevent sun scorch in summer.

The plant offsets freely and flowers well, readily setting seed which resembles that of *Parodia* species. However another plant of Japanese origin, with the suffix *monstruosa*, which is on *Myrtillocactus geometrizans* stock, seems to grow well in shadier conditions. It is a very fast grower; recently I removed about a dozen offsets and within a week it was impossible to see whence they had been taken.

A useful tip for anyone who intends to graft offsets is to do so immediately they have been detached - they shrink to nothing within a day or two, otherwise.

We have slides of *Blossfeldia liliputana* available in our slide library - any slides of further species would be very welcome - A.W.C.

MELOCACTUS

Mrs L. Teare writes "I would like to know how old a Melocactus has to be before it grows a cephalium. I am under the impression that all Melocactus species may be divided into two sorts - those that in their native habitat grow a cephalium when quite young and the others which need to be much older and bigger before they will form a cephalium. Is this correct?"

"The recent hot weather has been good for my own plants. In the south of France where I have cactus friends, all their plants stop growing during July and August with the exception of the Melocactus and Discocactus, which love the heat and grow and flower better than."

E.W. Barnes tells the Chileans that "I have just received another Melocactus, sent by a friend in California. It is a 3" diameter plant of Melocactus matanzanus - a Cuban species, of which it is now impossible to collect seed. This plant has a 1" cephalium. It is reputedly seed grown, in very good condition; these plants retail at about 12 to 15 dollars in the U.S.A. and there was 3 dollars air mail charge in addition. Costs would probably be less on a number of plants. From observations made by the supplier of this plant it appears that cephalium production is quite rapid even with small plants, which is in contradiction with all I have observed on imported cephalium bearing specimens."

"I am also told that they have stood a temperature of 45°F for some weeks during the winter seasons when being raised, with an occasional short period of as low as 39°F. One would expect these particular plants to be pretty hardy, in consequence".

Some interesting sidelights were offered by K.V. Mortimer on the phenomena of small Melocacti with cephaliums. Small plants with cephaliums have in fact been found in habitat when normally the species is much larger before a cephalium is formed. Search eventually revealed a mature plant with a damaged or destroyed growing centre, carrying a number of offsets; these offsets carried a cephalium when quite small, but obviously this would be accounted for by the maturity of the main body.

Nurserymen are now emulating this phenomena by decapitating mature Melocacti, so that the old established plant body then forms offsets which will generate a cephalium when the offset is quite small. The offset can then be detached and rooted in the usual manner. This can account for a great many of the small cephalium carrying plants which have recently appeared in collections. A similar comment was made briefly by E.W. Barnes in Chileans No. 13 p. 120.

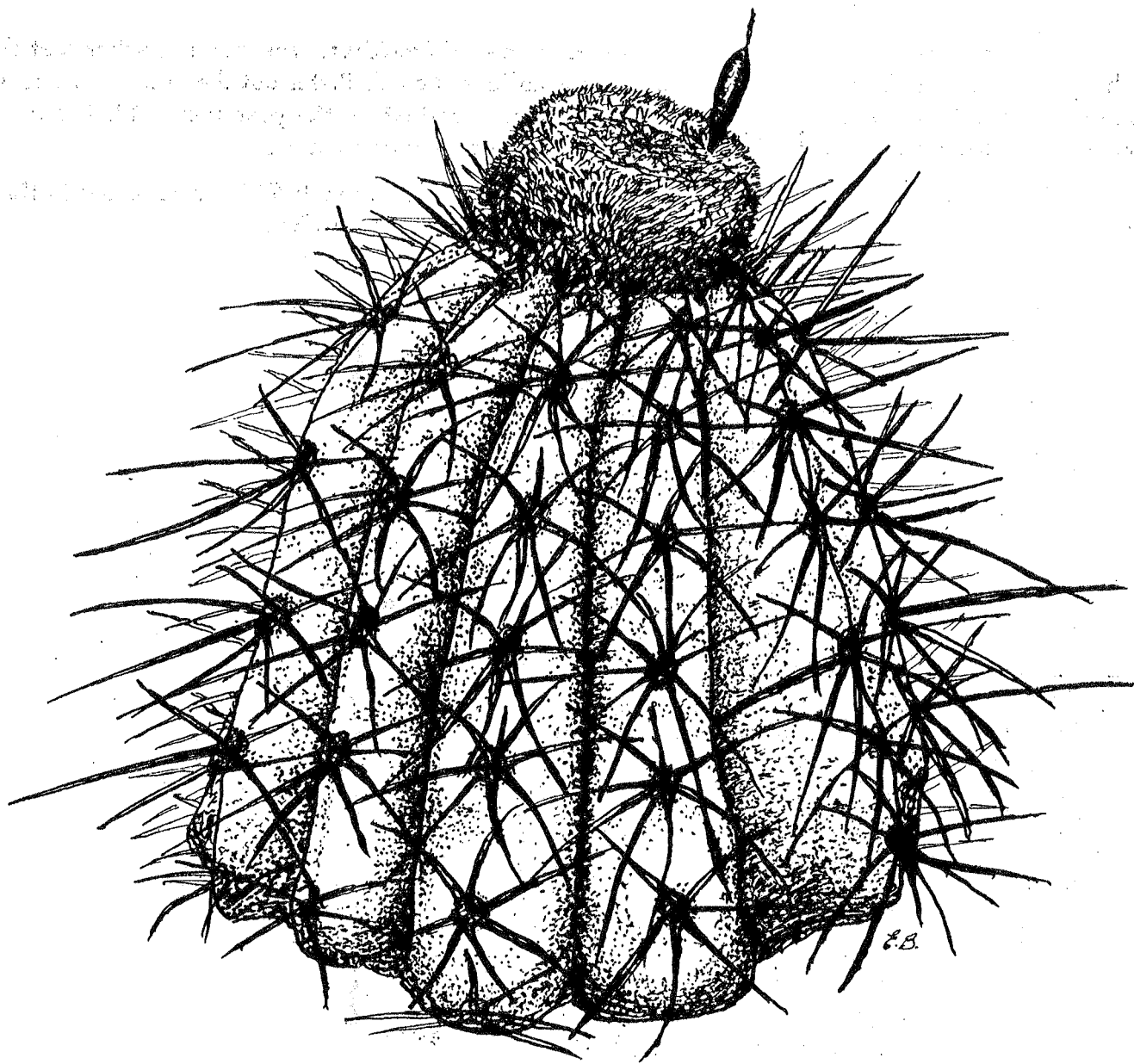
Mr. & Mrs. T. Lavender discovered a Melocactus in the Jardin Exotique in Monaco this September, not long imported and recently potted up in about an 8" pot, which had evidently been damaged at the growing tip in habitat, for it carried five offsets at the crown, each offset bearing its own cephalium. The main body would be about six or seven inches in diameter and height and the offsets would be about two inches in diameter and about two and a half inches in height.

In our Chileans No. 13 we carried an illustration and some notes on Melocactus HU 132 sp. nova. Unfortunately in the title to the article the HU reference numbers were transposed.

We have one or two slides of Melocactus in our slide library - any additions will be very welcome - A.W.C.

TRANSLATIONS

Following the response to the request for assistance with translations in our previous issue, the position is now much improved - with the exception of Czech. We have a number of articles from Czech Cactus Journals on hand which contain valuable information which is at present denied to us. I should be very pleased to hear from any of you who may be able to offer to assist with translations from Czech - H.M.



MELOCACTUS HU 237 MELOCACTOIDES. Collection: E.W. Barnes.

F.R. NUMBERS

..... from R. Zahra:

This week I received a new seedlist from H. Winter of Frankfurt. You may remember that this firm had been the sole distributor of the cactus seeds collected by F. Ritter but they seemed to cease business in 1962. Now out of the blue I have received this seedlist for the year 1969. This list is made up of F. Ritter's seeds and a large number are newly collected species.

I checked many of the FR numbers with the lists published in the 1967 Year Book and in the Chileans and found a total of 54 which had not been listed there, as follows:-

FR 632	<i>Lobivia wrightiana</i>
FR 1013	<i>Pilosocereus minensis</i>
FR 1026a	<i>Notocactus linkii</i>
FR 1026b	" " var. <i>buenekeri</i>
FR 1027	<i>Notocactus arechavaletai</i>
FR 1050	<i>Haageocereus vulpens</i>
FR 1101	<i>Rebutia gracilis</i>
FR 1114	<i>Rebutia</i> sp.
FR 1125	<i>Parodia obtusa</i>
FR 1140	<i>Rebutia</i> sp.
FR 1155	<i>Trichocereus randalli</i> (= <i>Tricho. superbus</i> n.n.)
FR 1217	<i>Pilosocereus carolinensis</i>
FR 1229	<i>Zehntnerella chaethacantha</i>
FR 1231	<i>Leocereus bahiensis</i>
FR 1236	<i>Mirabella albicaulis</i> v. <i>piuiensis</i>
FR 1239	<i>Brasilicereus phaecanthus</i>
FR 1249	<i>Piptanthocereus jamacaru</i>
FR 1262	<i>Cephalocereus fluminensis</i>
FR 1265	<i>Notocactus ottonis</i>
FR 1266	<i>Notocactus lativirens</i>
FR 1266a	<i>Notocactus ottonis</i> var.
FR 1266b	<i>Notocactus ottonis</i> for.
FR 1266c	<i>Notocactus ottonis</i> v. <i>acutangularis</i>
FR 1268	<i>Notocactus purpureus</i>
FR 1284	<i>Parodia alacriportana</i>
FR 1295	<i>Calymmanthium fertile</i>
FR 1296	<i>Cleistocactus villaazulensis</i>
FR 1325	<i>Pilosocereus aurilanatus</i>
FR 1329	<i>Micranthocereus purpureus</i>
FR 1340	<i>Coleocephalocereus decumbens</i>
FR 1345	<i>Pilosocereus supremus</i>
FR 1375	<i>Notocactus securituberculatus</i> v. <i>mimiatispinus</i>
FR 1376	<i>Notocactus glaucinus</i>
FR 1376a	" " v. <i>depressus</i>
FR 1380	<i>Notocactus megapotamicus</i> v. <i>horstii</i>
FR 1380a	" " v. <i>vulgatus</i>
FR 1380b	<i>Notocactus megapotamicus</i> v. <i>crucicentrus</i>
FR 1381	<i>Notocactus muricatus</i> v. <i>flavifuscus</i>
FR 1382	<i>Notocactus mammulosus</i>
FR 1384	<i>Wigginsia sellowii</i>
FR 1387	<i>Notocactus herteri</i>
FR 1388	<i>Notocactus globularis</i>
FR 1389	<i>Notocactus arechavaletai</i> v. <i>nanus</i>

FR 1393a	<i>Notocactus scopa</i>
FR 1394	<i>Notocactus crassigibbus</i> v. <i>gracilior</i>
FR 1395	<i>Notocactus arachnites</i>
FR 1396	<i>Notocactus arachavaletai</i> v. <i>aureus</i>
FR 1399	<i>Notocactus sucineus</i>
FR 1401	<i>Parodia</i> sp.
FR 1401a	<i>Parodia</i> sp.
FR 1402	<i>Wigginsia horstii</i> v. <i>juvenaliformis</i>
FR 1402a	<i>Wigginsia horstii</i>
FR 1403	<i>Wigginsia prolifera</i>
FR 1403a	<i>Wigginsia longispina</i>

The introduction of the name *Wigginsia horstii* adds a further problem to the combination of all *Wigginsia* and *Notocactus* under the genus *Notocactus*, since there already exists *Notocactus horstii*. - H.M.

SEED RAISING

..... from J.L. Arnold:

I have experimented with various types of seed-raising mixtures but in 1967 I used Levington compost very successfully and so I am using it again in 1968. In 1966 I used a leafmould and sand mixture and certain larger seeded species did quite well in it. The Levington mix does seem to be especially good for small-seeded species like *Parodias*. The *Melocacti* thrive in Levington and I have found from experience that they must be grown on in Levington until they are about $\frac{1}{2}$ " across. I had a lot of casualties when I planted a batch of three-year old *Melocacti* seedlings into a leafmould/sand mixture when they were about $\frac{1}{8}$ " across, mainly I believe because the mixture dried out far too quickly for the shallow rooted seedlings. As the Levington remains moist for longer after watering, they then thrive.

I have always sown all my seed in April and May without heat, as I do not have a propagator. I believe that the temperature difference between day and night to be of great benefit with germination and I have not noticed much difference in comparison with other collectors. In the winter I treat the plants virtually as adults and they remain dry and cool from October to March.

With this treatment I have seldom had any losses and they usually recover very quickly in the Spring.

I am very interested in *Frailea* but this is the only genus I have never been successful in growing from seed until this year when I raised some *F. castanea* from seed from my own small plant. I am hoping they will survive and mature. Also in 1968 I obtained six species of *Sulcorebutia* and was very pleased to have four species germinate within a fortnight.

..... from D. Angus:

This year I have turned over to growing most of my seed in Levington compost, with very satisfying results. For three years running I have tried without success to grow *Islaya* from seed in traditional seed composts and had no germination at all. This year I have sown *I. divaricatiflora* in Levington and obtained about 25% germination.

..... from Mrs. L. Teare:

Having read the article on seed raising (Chileans No.11 p.68) I would like to tell you of my experience in raising cacti and succulents from seed in a soil-less compost for the last three years. I use vermipeat as the growing medium - this is a proprietary mixture containing vermiculite, peat, and fertiliser with trace elements. I found it very good with seedlings growing at an astonishing rate. *Mammillaria zeilmanniana* flowered the first year from seed and so did *Rebutia grandiflora*; even slower growing cacti like *Lophophora* or *Escobaria* grew quickly.

I have always used tap water for watering; I place two seed trays in a box lined with polythene which enables me to water from below. Later, when the seedlings are transferred to larger trays, I spray them every day. One drawback with vermipeat is that when you water, the vermipeat swells so much that you may find your seedlings 'floating' on the top. I corrected this by putting a layer of sand over the vermipeat and it solved the problem.

This compost has a tendency to go dark and form algae after about a year and again this problem is solved by using a top layer of sand. I sowed some *Mesembryanthemum* in September with the top third of the mixture Levington compost over the bottom two thirds vermipeat; the seedlings are doing well and again free of algae.

After two years cacti seem to need a more substantial soil (perhaps the fertiliser is exhausted? - H.M.) for in the third year they seem to shrink. I nearly lost a whole tray of *Rebutia* after they had been in vermipeat for over two years. *Mesembryanthema* seem to grow well in it for three years; I experimented with growing *conophytum* in both vermipeat and a more orthodox compost of John Innes No.2 plus silver sand, the former in a tray and the latter in a clay pot. The plants grown in vermipeat now have as many as thirteen heads whilst in the pot with J.I. compost they have remained single.

PARODIA

A seed raising experiment:

A batch of over a hundred different species and varieties of *Parodia* seed has been purchased from our funds and distributed equally to four members of the *Parodia* Robin, all of whom have had a fair amount of experience in growing *Parodia* from seed. Each will be keeping a record of compost and of watering and other cultivation methods and percentage germination will be recorded, together with any particular difficulties or successes.

We shall be reporting the outcome of this experiment in due course in these pages.

ERRATA - NO.14

In the article on *Gymnocalycium koselskyanum*, there is a reference on page 12 to "arillus of yellowish hue". This is an accurate translation of the author's words but the author has used the term "arillus" incorrectly: he should have stated "hilum of yellowish hue". Likewise line 4 on page 33 should read "hilum margin" in place of "arillus".

The article on p.13 was translated by W. Keugler.

The last sentence on p.46 should commence "We must not suppose".

STUDY GROUPS / ROUND ROBINS

English	Cleistocacti	A.A.Sadd, 26 Carlisle St., Island Bay, Wellington S.2., New Zealand.
	Copiapoa	D.J.Lewis, 16 Brundall Crescent, Cynwell, Cardiff, CF5 4RU.
	Epiphytes Frailea	A.J.S.McMillan, 5 Oakfield Road, Bristol BS8 2AJ. J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland.
	Gymnocalycium	G.H.Swales, 5 Hillcresh, Middle Herrington, Sunderland, Co.Durham.
	Hydroponic Culture	P.R.Hallett, Llaregyb, 20 The Garth, Bull Bay, Amlwch, Anglesey.
	Lobivia	R.E.Hollingsbee, 46 Markland Road, Dover, Kent.
	Matucana/Borzi- cactinae	Contact the Chileans.
	Mediolobivia	J.Chapman, 5 The Crescent, Raunceby Hospital, Sleaford, Lincs.
	Melocactus/ Discocactus	E.W.Barnes, 22 Coniston Grove, Ashton under Lyne, Lancs.
	Miniature Opuntia Neoporteriae	D.E.Watling, 52 Frances Road, Windsor, Berks. D.Rushforth, 80 Cheltenham Road, Gloucester GL2 0LX.
	Notocactinae	K.H. Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton.
	Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lincs.
	Photographing Cacti	A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees, Teesside.
	Sulcorebutia	W.G.Sykes, 10 Ashley Close, Thornton Cleveleys, Lancs.
	Trichocereus	N.T.Hann, 5 Lake Road, Shirley, Croydon, Surrey, CR0 8DS.
German	Chileans, Echinopsis, Epiphytes, Gymnocalycium, Islaya, Parodia, Rebutia & Lobivia - W.Kinzel, 53 Duisdorf/Bonn, Bonhoefferstrasse 16, West Germany.	

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Slide Librarian A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees, Teesside.

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