

THE CHILEANS '97

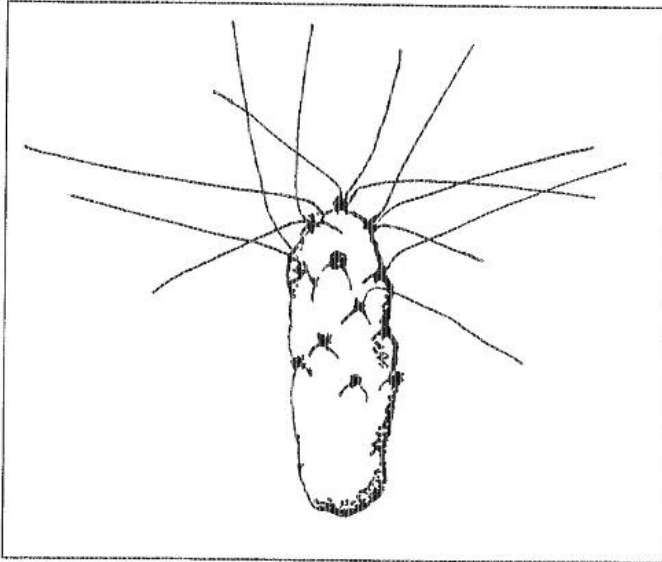
VOLUME 17 NUMBER 55



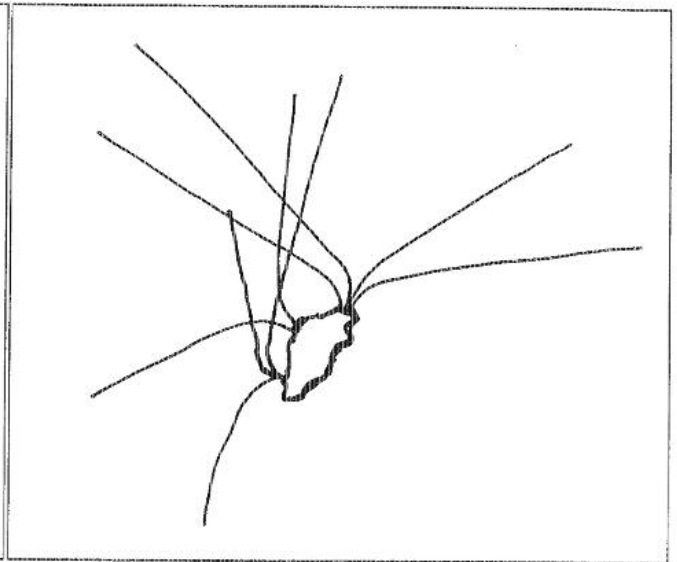
Parodia setifera

Lumbreras, Argentina

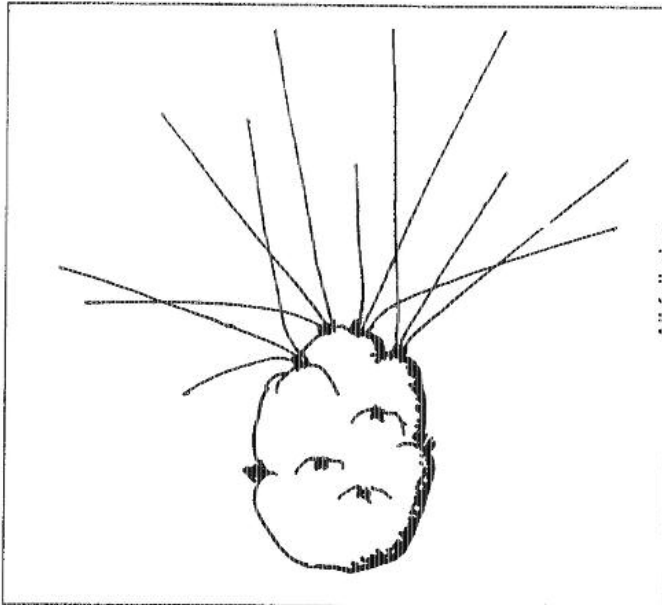
Photo - F. Kasinger



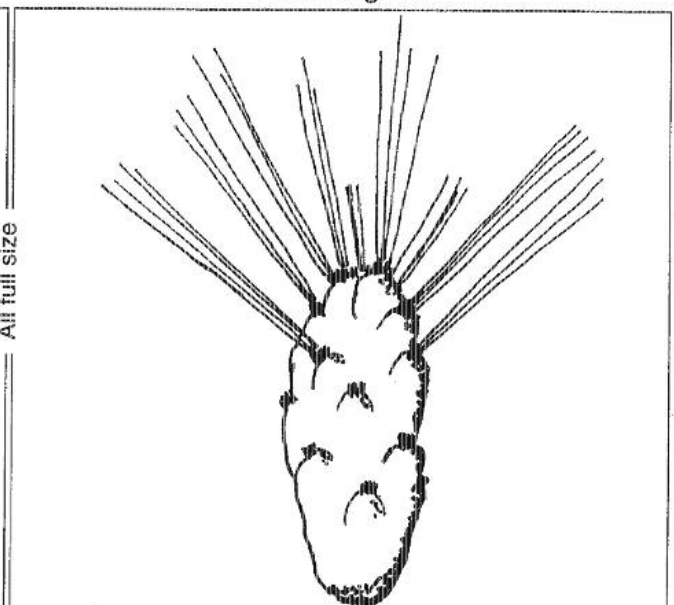
TG 12 Payogasta
K. Gilmer



BDH 11 N. Cotagaita
R.K. Hughes

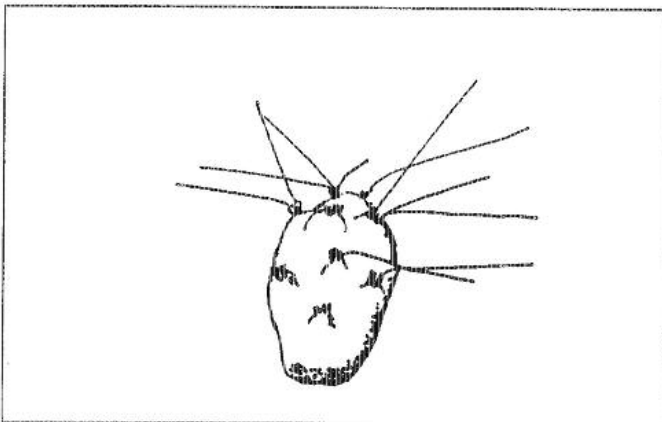


GC 167 Salinas Grandes
G. Charles

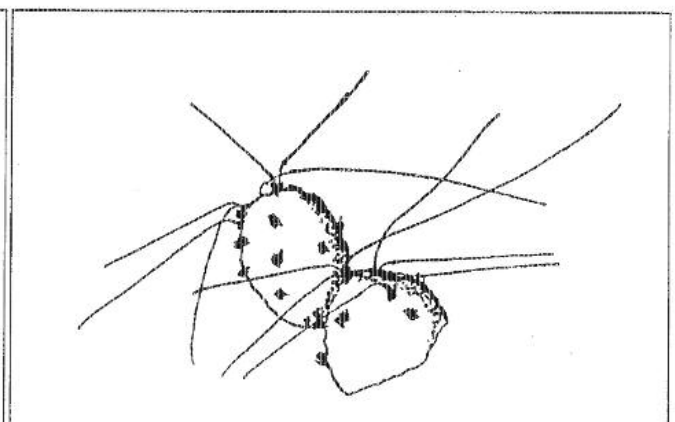


TG 41 Fiambala
K. Gilmer

All full size



GC 162 Puerta Tastil
R. Ferryman



GC 164 Santa Rosa de Tastil
G. Charles

Tephrocactus bolivianus

TEPHROCACTUS BOLIVIANUS - OR NOT TEPHROCACTUS BOLIVIANUS? From R.K.Hughes

In Chileans No.51 there is a comparison between the original Salm-Dyck description of *Opuntia bolivianus* and Ritter's description of *Tephrocactus bolivianus*, from which it is concluded that they are one and the same species. On the other hand, I conclude exactly the opposite - that they cannot be the same. The main point that I see separating the two descriptions is that of the spination. Salm-Dyck's four long, flexible, needle-like hardly diverging spines can only be describing the altiplano-type plant. The spines on the large fat segments of the *T.ferocior*-like plants are long, strong, and very stout. They diverge in all directions, the longest tending to be straight (although some do have a slight twist in them) whilst the shorter ones are often curved or twisted. Ritter's description refers to spines spreading, bending, and interweaving.

A check on my *T.ferocior*-like plants show they have 10 to 11 spines per areole spreading in this manner. My altiplano-type plants from Bolivia have four needle-like spines per areole. Other dactylifera forms from Peru have up to six spines per areole on one plant and up to seven per areole on another. By using a magnifying glass, white spots can be found to occur on both types of plant. The altiplano type plants can readily be described as having elongate egg-shaped segments. In contrast to this, the large chunky segments of the *T.ferocior*-like plants are better described as ovoid or ellipsoid in shape.

My main reference in the literature is to the *Tephrocactus* book by Leighton-Boyce and Iliff, which is put together in a scholarly manner with regard to references and original descriptions. They quote the full latin text for both *O.pentlandii* and *O.boliviana*, with any differences or additions to the earlier text. Their *O.bolivianus* translation, although essentially the same as that quoted in Chileans No.51 p.146, is longer, with a preceding and a following additional paragraph. There are also slight differences, such as:

Chileans 51 - "The old stem is a foot high"

Leighton-Boyce and Iliff - "The plant in full age reaches 30 cm or more"
as well as:

Chileans 51 - "Spines flexible upright below and not radiating away from each other"

Leighton-Boyce and Iliff - "Spines supple stiff, erect and close-set at the base, divergent above, straight or flexuous".

There is a possibility that *T.pentlandii* could be accepted as the altiplano-type plant but, if so, then *T.bolivianus* has a to become a synonym of it and not used for the *ferocior*-type plant. In addition, the reference to the travels undertaken by Pentland suggests that he collected the plants personally before despatching them to Europe. Is it not just possible that people travelled to places beyond his reach and, knowing of his interest, could have brought or sent plants to him which he then despatched to Europe?

.....from H.Middleditch

There is certainly a difference in the manner in which the height of *Tephrocactus bolivianus* is translated, as given in Chileans No.51 compared with the Leighton-Boyce and Iliff version. As indicated in Chileans 51 p.146, this species was first published in *Allgemeine Gartenzeitung* in 1845 with Salm-Dyck as author, and later in 1850 in Salm-Dyck's own publication. It is the 1850 description which is reproduced by Leighton-Boyce & Iliff, together with a translation of the same 1850 text, whilst they also make reference to one or two points from the 1845 AGZ text. Both the 1845 and 1850 descriptions follow the layout typical of many of those which first appeared in the first half of the 19th century. These commonly consisted firstly of a diagnosis, or description proper, followed by a further paragraph which was frequently headed "Obs", short for observations. Strictly speaking, it would be the first paragraph which would be regarded as the official description. Whilst the "Obs" usually repeated much of the data in the preceding paragraph, quite often some additional data was included which was not infrequently quite significant.

The description of *Opuntia bolivianus* by Salm-Dyck, both in 1845 and 1850, followed the format typical of the time, but in this instance the second paragraph was not subtitled "Obs". But, again typical of the time, the second paragraph did include some valuable additional scraps of data. The 1845 description consisted of 7 lines of latin diagnosis followed by 17 lines of "Obs" in German. The 1850 description comprises five lines of latin diagnosis followed by 7 lines of "Obs". Because it is always the original description by which we are bound, it is the 1845 description which appeared in Chileans No.51. Not surprisingly, there was more data in the 17 lines of the 1845 "Obs" than in any of the other three paragraphs, so that, to avoid undue repetition, it was that paragraph and only that paragraph which appeared in Chileans No.51. Certainly this is not identical to the other three paragraphs from 1845 and 1850, but fortunately there does not appear to be any confliction between the four paragraphs.

Attention is drawn by R.K.Hughes to that phrase in the translation in Chileans 51 which reads "The old stem is a foot high .." whilst Leighton-Boyce and Iliff render the 1850 version as "The plant in full age reaches 30 cm or more". The 1845 description reads in German "Der alte stamm is uber einen Fuss hoch". According to my Collins' German-English dictionary, "Fuss" means amongst other renderings appropriate to other contexts, "foot, (measure)". Thus, from the German, the plant is over a foot tall. The 1850 description is all in latin and reads "Planta senecta pedalis et ultra". In Stearn's *Botanical Latin* (1973) we find "pedalis = a foot long (about 30 cm)". whilst my Chamber- Murray Classical Latin dictionary (1985) gives "pedalis = a foot long". Neither the 1845 nor the 1850 description make any specific reference to a height of "30 cm or more".

In regard to the suitability of these alternative translations from the latin, Stearn's 'Botanical Latin' is a valuable compilation of present-day usage; as Stearn himself observes, "botanical latin [is] now so distinct from classical latin as to require independent treatment". But in the early 19th century such a ready reference for botanical latin simply did not exist. At that time the latin language was still of significant importance for the clergy and the legal profession, although it probably diverged here and there from the

classical latin of Vergil and Pliny. In the early 19th century the form of latin used by botanists probably diverged appreciably from classical latin in respect of words for parts of plants and particularly in regard to parts of flowers, for in the days of the Roman Empire there was probably little or no need for such words. Available evidence suggests that botanists of the early 19th century used classical latin where it was adequate for their purposes. Hence for Salm-Dyck's "pedalis", a rendering of "a foot", as from the German, might seem to be appropriate.

However, a far more down-to-earth consideration applies when it comes to interpreting Salm-Dyck's description of the height of *Opuntia bolivianus*. When Napoleon was in his heyday of conquering much of Europe, he appears to have recognised that an army marches on its stomach. So his quartermaster-general had to purchase victuals where-ever the army went. But apparently he failed to do this to Napoleon's satisfaction and on being castigated for this, he complained that his task was made excessively complicated by the individual system of weights and measures used, not just in each state, but in a great many of the towns where victuals had to be purchased. So Napoleon cured that problem by establishing a common set of weights and measures which he imposed throughout the length and breadth of Europe occupied by his armies - the metric system. However, one may care to recollect whose side the Prussians were on at Waterloo. It would be difficult to imagine Prince Joseph Maria Franz Anton Hubert Ignaz zu Salm-Reifferscheid-Dyck being prepared to even acknowledge the existence of Napoleon's metric system, never mind actually use it. The Prussians measured in Fuss, Zoll, and Linien and not in Napoleon's metric system. Hence the "over a foot high" for Salm-Dyck's *Opuntia bolivianus* quoted in Chileans No.51. However, it does appear that Napoleon did finally succeed in converting Leighton-Boyce and Iliff to his system, even though he failed to do so with Salm-Dyck's description of *Opuntia bolivianus*.

A quick comparison of the description of the spination provided by Ritter with that given in the 1850 Salm-Dyck rendering in latin could understandably lead to the conclusion reached by R.K.Hughes that they are dissimilar. The 1845 and 1850 descriptions of *O.bolivianus* both start with a compact latin diagnosis which describes the spines as "erecto-divergentibus". The 1845 description of the spines (in German) runs "unten aufrecht und nicht strahlenformig auseinanderstehend, und [oben] hin und her gebogen" i.e. upright below and not disposed apart from each other and [then] bent in various directions. The Leighton-Boyce and Iliff description of *Opuntia bolivianus* is the 1850 version, together with brief notes relating to the 1845 version. This 1850 latin description of the spines reads "basi erecti, collecti, superne divergentes" i.e. upright and bunched closely together at the base, divergent above. These three Salm-Dyck descriptions are not precisely identical but they do not conflict with each other. They tell us that the spines emerge from the areole all parallel to each other, or virtually so, like the bristles of a brush. They are "close-set at the base", they are "upright and not radiating away from each other". If they all emerge from the areole cushion parallel to each other, they can hardly be other than close-set. Then above, they are "divergent", "bent here and there", curved in various directions - as one may wish to render the originals in english. But they are not all bent the same way - they are "bent in various directions". So much we are told about the spines by Salm-Dyck.

Let us now consider what Ritter has to tell us about the spines on his *T.bolivianus*. After providing his reader with the 1850 Salm-Dyck description Ritter then observes that it conforms well with his own understanding of *T.bolivianus*. From this observation, one might presume that Ritter meant us to understand that the spination on his *T.bolivianus* was a good match for Salm-Dyck's description of the spines on his own *Opuntia bolivianus*. Ritter goes on to say that on his *T.bolivianus* the spines are "marked[ly] spreading, bending, and interweaving", they are "distinctly spreading and overlapping". If the spines spread in various directions i.e. "hin und her gebogen" per Salm Dyck 1845, then one spine from one areole can hardly avoid overlapping a spine or spines from another areole. If one spine happens to go under a spine from an adjacent areole and then over another spine, the spines will interweave, as Ritter observes.

We are not told by Ritter that the lowermost section of the spines emerge from the areole almost parallel to each other, and then bend. Does he assume his reader understands this when he says that the Salm-Dyck description matches the plants he classifies under this name? Or is it because he did not notice or did not specifically record this rather short, upright length at the base of the spines? To exit from a sunken areole, spines can only diverge either at the areole cushion or at a short distance above it. It is hardly possible for the spines on Ritter's *T.bolivianus* to emerge from the areole other than parallel to each other, before they bend away in various directions.

This is where we come to the valuable observation made by R.K.Hughes in respect of the spination of the *Tephrocacti* met with in the Potosi-Cuchu Ingenio area. They had spines "diverging in all directions" i.e. hin und her, per Salm-Dyck 1845. What we are not told by R.K.Hughes is whether the lowermost short section of spines as they emerge from the areole lay virtually parallel to each other. It is not exactly the simplest of matters to get a good look at the details of spine form and disposition on a hummock-shaped *Tephrocactus* in habitat. Nor is the arid altiplano and a tight timetable conducive to making cross-sections of areoles on the spot. Perhaps this is why this detail is not quoted by R.K.Hughes?

.....from R.K.Hughes

You may like to have a look at the spine clusters on a dried-up segment of *T.ferocior* which attached itself to me at BDH 11 at 3012 m altitude, just north of Cotagaita.

.....from H.Middleditch

This dried-up segment is a very valuable piece of data. There is only a small leathery lump representing the remains of the segment but the spines are in very good condition. It is some years ago that a selection of slides were taken by F.Fuschillo to his usual excellent standard and screened at The Chileans Weekend, showing sections through areoles of various *Tephrocacti*, taken off cultivated plants. In this way confirmation was obtained of the form and nature of the sunken areole referred to by Kiesling in his treatment of

Tephrocactus (Darwiniana 25 (1-4) 1984 and depicted there in his Fig.1. Both the slides and the Kiesling figure demonstrated very clearly the tubular form of the sunken areole. They also show that the areole wool, bristles, and spines, emerge from the base of the areole pit, so that the narrow areole pit constrains the lowest portion of the spines on most Tephrocacti ("cumulopuntia", "maihueniopsis") to adopt a parallel attitude. This lowermost short length of spination, which would normally be hidden from the view of the observer by the areole pit or by the protruding areole wool, may be clearly seen on the dried-up ex-habitat segment from R.K.Hughes. On this segment the majority of the spines bend sharply or fairly sharply at a very short distance above their base. They are not the long, needle-like, hardly diverging spines which R.K.Hughes tells us are typical of the altiplano plants, but on the contrary the spines are "unten aufrecht and nicht strahlenformig auseinanderstehend, und [oben] hin und her gebogen" in conformity with the 1845 Salm-Dyck description. The spination on this dried-up segment from R.K.Hughes is also in general accord with Ritter's description of the spination on what he regards as T.bolivianus.

Perhaps this form of spination may have been observed by other travellers who have come across Tephrocactus bolivianus in the field?

.....from K.Gilmer

When travelling along the road from Payogasta towards Pampa de Tintin and Quebrada Escoipe, we stopped when we were about 10 km east of Payogasta. Here we saw hummocks of Tephrocactus, scattered far and wide over ground littered with sharp stones. Also growing here were sparse patches of dwarf bushes and occasional dry tussocks of grass. The larger hummocks of Tephrocactus were up to half a metre across and roughly half as tall as their diameter. The segments were all packed tightly together, but we did manage to remove one segment which was then photographed on its own. This does seem to fit Ritter's description of T.bolivianus.

.....from H.Middleditch

On the picture taken by K.Gilmer of a single segment off a Tephrocactus, only the areoles in roughly the uppermost quarter of the segment bear any spines. This may be due to the very compact nature of the hummock so that there would be no room for any spines growing from the lower areoles; nor would there be any need for protective armament other than on the exterior of the cushion. Although a few spines do appear to be directed upwards from the segment, it is quite easy to see that most of the spines are curved or bent as they emerge from the areole wool and then adopt a disposition where they would lie more or less over the surface of the cushion as a whole. Where there is more than one spine per areole they frequently diverge away from one another (above the bend) rather than lying side by side pointing radially away from the segment. These spines then overlap or underlap those from other areoles - they are "hin und her gebogen" per Salm-Dyck 1845 as well as "spreading and overlapping" (Ritter 1980).

It must have taken quite a search of the plants at this location to find a segment for removal and photographing which displays these features so splendidly

.....from K.Gilmer

We did not make any search at all at TG12 (where the picture was taken) to look for a suitable segment to remove from the hummock. We just took one off the plant which was nearest to hand.

.....from G.Charles

Travelling through the Quebrada del Toro we stopped about 4 km to the north of Santa Rosa de Tastil where we found scattered hummocks of Tephrocacti growing on gently sloping ground with steep rocky hills beyond. Before our departure it had been mentioned by H.Middleditch that the picture taken by K.Gilmer of a single Tephrocactus segment had provided a far better impression of the spination than a view of a complete Tephrocactus plant, so that at this site GC 164 a couple of segments were removed from one plant of Tephrocactus and laid down on the stony ground to be photographed off the plant.

.....from H.Middleditch

This photograph taken by G.Charles in the Quebrada del Toro is of a couple of segments of Tephrocactus, having quite long spines of a buff or golden brown colour. There is not even one single upright spine. Every single spine on both segments is bent either close to, or shortly above, the areole wool; also they are all bent to such a degree that all the spines on one segment are virtually lying in the same plane. On each segment, only the topmost half dozen or so areoles carry spines. Most of these areoles have more than one spine per areole and the spines emerging from one areole diverge away from each other, radiating from the areole rather than projecting away from the segment. In consequence one or two of the spines from a given areole cross a spine or spines from other areoles. A better match for the spination described both by Salm-Dyck and by Ritter for T.bolivianus, it would be difficult to imagine. Presumably a great deal of careful searching was involved to find a segment so closely conforming to the original description before removing and photographing it.

.....from G.Charles

No, it was just a pair of segments picked at random. It was more a matter of looking to see which segments would be less of a problem to cut them off the plant. Indeed, even when the photograph was being taken I had no idea why I had been asked to do it!

.....from N.Wilbraham

On the occasion of the I.o.S. Conference at Salta, we undertook a coach trip up the Quebrada del Toro. One stop was made near Tastil which provided an opportunity to stroll away from the coach - but not too far away. At this place there were a number of hummocks of a Tephrocactus. We were able to photograph both a very spiny hummock and also - only a few yards away - another plant which was spineless but similar in all other respects to its spiny neighbour.

.....from H.Middleditch

One of these two pictures is of a very spiny Tephrocactus which might possibly be described as a typical

T.bolivianus. Not all the spines appear to be bent sharply at a point close to the areole. Certainly not all spines on any one segment seem to cross one another. On many segments there are some spines which seem to be pointing more or less upwards from the areole. There seems to be a small number of areoles bearing spine clusters typifying the Salm-Dyck and Ritter descriptions, like that caught in the photograph by G.Charles, also taken in the middle reaches of the Quebrada del Toro. The second picture taken by N.Wilbraham is of a *Tephrocactus* which at first glance seems to be almost completely lacking in spines, but on closer inspection some segments may be seen to have either only one areole with a single spine, others with two areoles with a spine or two, but certainly no segment with an armament remotely approaching that of the other, well-spined plant. On this very sparsely-spined plant there is a surprising variation in spine length, most spines having a length barely equal to the segment diameter, some being even shorter than that, a few spines being up to as long again. Only on one areole of one segment are there three spines of a length equal to some three times the segment diameter, bent sharply so that these spines radiate out away from each other in one plane. The spiny and the spineless plant share a common feature in having a lack of constancy in their spination, from one segment to another.

.....from K.Gilmer

At site TG 48, some 5 km to the south of Iturbe, at 3300 m altitude, we came across a population of *T.bolivianus*, spread over an area of about a quarter kilometer square. Almost all of these plants were quite spiny but among them we also found six or seven plants which were virtually spineless. These spineless plants grew rather closer to the ground, being more of a mat than the hummock shape of the spiny plants. There were no transition forms between the spiny and the spineless sorts. This spineless form is cultivated in Germany under the name of *Tephrocactus subinermis*, or sometimes even under the name of *T.ovallei*. This particular spineless plant is not mentioned by Kiesling in his review of *Tephrocactus*, so it may be that he did not come across this particular form at this location.

.....from G.Charles

On our way back from the Argentine-Bolivia border, we made an excursion to the east of Humahuaca, taking the road which goes to Aparzo. We went past Pucara and then the road went steadily up a moderate slope, practically dead straight. It then entered a minor valley out of which the road climbed in a series of zig-zags. Just before the start of this climb, we stopped briefly to look at a broad mat of *Tephrocactus*, which must have been a good metre across. This may have been formed of more than one plant, but it certainly looked as if it was one single plant. There were patches of this plant with spiny segments but most of the segments that could be seen really had no spines at all - or perhaps just the one spine! The spiny patches did not follow any pattern so that it was hardly possible that this mat was made up of a large number of plants, some spiny and some spineless.

.....from R.Ferryman

When we were travelling up the Quebrada del Toro we made a stop at GC 162, near Ing. Maury. There were steep rocky slopes here and a river wash coming in from the east. Here we came across some *Tephrocactus bolivianus*, our first sighting of this species in the course of ascending the Quebrada del Toro. As requested by H.Middleditch prior to our departure from the U.K., a single segment was removed from one plant and photographed on its own. The segments on this particular plant were smaller than those seen on most of the *T.bolivianus* which we came across later during the course of our trip through Argentina.

.....from H.Middleditch

From the photographs both of the single segment and the plant from which it was removed, the impression is given of spines which are mostly chalk-white in colour. On the single segment, a tinge of brown is evident at the tips of most spines, and in addition the brown tinge darkens from faint to deep over the upper half of several spines. At the top of the segment the spines point upwards and outwards to varying degrees but roughly form an obtuse cone, the spines from the other areoles adopting similar attitudes. On this segment only two or three spines in total appear to be bent shortly above the areole wool.

.....from K.Gilmer

We also made a stop just to the north of Ing Maury where we also took one segment off a plant. The spines on this segment were not much longer than the length of the segment, straight and stiff, mostly a greyish white colour. The spines on the very topmost areoles stand straight upright, the lowermost spines (about half way down the segment) stand out directly sideways, those between are half upright. All the spines on this plant were the same greyish-white colour and in fact all the plants we could see in walking round at this location bore greyish-white spines. But that is as far as the similarity went, because the length of the spines as well as their disposition changed from one plant to the next; some plants had straight spines, some had bent spines.

.....from G.Charles

Not much further along the Quebrada del Toro we stopped a short distance beyond Puerta de Tastil at GC 163. Here we climbed up the hillside to the west, where we found more *Tephrocacti* growing on a gentle slope with steeper sloping ground ahead. One segment was removed from a plant to be photographed on its own. The spines were really quite long, straight, from pale buff to golden brown in colour. All the spines came from the areoles in the topmost few mm of the segment; the topmost spines stood slightly off the vertical, the lowermost spines stood half upright. You will be able to see on the photograph that there are only one or two spines which are clearly bent after they emerge from the areole, and these are more slender than the great majority of the spines on the segment.

Further along the Quebrada del Toro, not far to the north of Santa Rosa de Tastil, at GC 164 we photographed a *T.bolivianus* with very long, thin spines. On this plant some of the spines were straight, others rather wavy; several spines were curved into a full semi-circle, others curved to the same extent but only at the

upper ends. One or two spines were coiled into a complete spiral.

.....from K.Gilmer

When we were some 30 km to the west of Fiambala (on the road which eventually leads to Copiapo) we removed one segment from one of the many hummocks of *Tephrocacti* growing there, and photographed it on its own.

.....from H.Middleditch

This segment possesses an almost cylindrical shape with spines emerging from areoles in roughly the top 20 mm or so of the segment. The spine-carrying tubercles are very blunt above and taper below into the general body of the segment, so that the top of the tubercles almost forms a shelf on which the areoles are sited. Consequently the areoles are facing half-upward or perhaps only 30° to the horizontal and as a result the spines emerging straight out of the areoles are disposed at about 30° to the vertical. Almost all the spines are arranged in this manner apart from the few spines at the apex from the very topmost areole which are almost upright. There does not appear to be a single spine which is bent on emerging from the areole. It is difficult to make a count of the number of spines per areole but this appears to be about five to six. The spines are all a golden yellow to yellowish-brown colour. The spination is somewhat similar to that on the segment photographed by G.Charles at GC 163 in the Quebrada del Toro, although on the segment at TG 41 west of Fiambala there are one or two more spines per areole, two or three additional spine carrying areoles, spines all disposed at a slightly more acute angle to the vertical, not a single bent spines, and all spines of a striking yellowish colour. In other words, even further from what might be considered representative of *T.bolivianus* according to the descriptions of both Salm-Dyck and Ritter.

.....from K.Gilmer

But within a pace or two of the plant with that spination there was another plant with spines bent sharply on emerging from the areole and pointing in various directions, in that respect conforming quite well to the original description of *Opuntia bolivianus*.

.....from G.Charles

When we stopped on the ascent of the Cuesta Capillitas and looked at the hummocks of *Tephrocactus bolivianus* growing there, we did get the impression that they were all rather similar to each other. However, this was our very first ascent into the Andes and also the first time that we had come across lots of these plants, so it is quite possible that we did not get down on hands and knees to look closely at the spination and take note of any variability that might be there. A few days later, when we stopped to look at more *T.bolivianus* in the Quebrada del Toro, we now began to realise how different they all were. There were plants with coarse spines, others with fine spines, some with very pale coloured spines, others with dark brown spines, and all shades between. On some plants the spines were sharply bent, on others the spines were hardly bent at all. And the length of the spination also differed appreciably.

Having then travelled north through the Quebrada Humahuaca we made a stop at GC 64, just to the north of Tres Cruces. Here the *T.bolivianus* all appeared to have segments of a very similar shape and size, but the spination varied dramatically. Some plants had spines which were immensely thick and fairly long, indeed they were the heaviest spination we saw on any of the *T.bolivianus* we came across in the whole of our 1994 trip to Argentina. But there were also fine-spined plants growing in roughly the same numbers on the same hillside. Many of the plants at this location had spines which were whitish in colour with dark brown tips. Even with all the variation in spination on *T.bolivianus* which we have seen in the course of our visits to Argentina, it was possible to see the segments because they were not obscured by the weight of the spination. At site 164 north of Santa Rosa de Tastil we saw some *T.bolivianus* with spines that almost obscured a view of the segments. But at Tres Cruces we saw plants with spination so numerous and dense that when looking at the plant, it was only the spination that could be seen, the detail of the segments being obscured.

After our overnight stop in Humahuaca we went off to the northeast in the direction of Aparzo. Not long after leaving the town we passed many *T.bolivianus* which formed fairly small cushions but when we had reached about 13,000 ft altitude we came across absolutely huge cushions of *T.bolivianus* at the base of the *Helianthocereus tarijensis* growing there. These plants were growing in a rather more lax fashion than those we saw at most other locations - the segments were not as closely packed together. The segments were also of a somewhat smaller size, somewhat similar in size to those found at GC 162, just north of Ing Maury, in the Quebrada del Toro, roughly 35mm long and 20mm in diameter.

Coming from San Antonio de la Cobres across the altiplano towards Purmamarca, we met with some more *T.bolivianus* at GC 169 shortly before we reached the pass through the mountains which separate the altiplano and the Humahuaca valley. This is probably the same site as TG 56. The plants here carried very fine golden spines, standing up like brushes, from only the top part of the segments. These plants were at an altitude of 4000 m at a very exposed site indeed, not far from the top of the pass. When we had crossed the pass and travelled only a few km on the descent into the Humahuaca valley, we stopped at GC 171 where the *T.bolivianus* displayed spines which were bent and spreading and of a darker colour.

It would probably be fair to say that there was a very wide range of spination to be seen on *T.bolivianus*. So much so that had one wished to select a particular spine count, colour, and disposition, and give the plant a species name, there would have been little difficulty in producing a dozen or more new names not only in the course of our travels in Argentina but even at many of the locations where we stopped.

.....from R.Kiesling, Darwiniana 25 (1-4) March 1984

Tephrocactus bolivianus This species is extremely variable, in particular in the features of the spines - the number, the size, the shape, rigidity and colour.

.....from K.Gilmer

At virtually every location where we came across *T.bolivianus* in Argentina we were able to find not just

one form of spination but a range of spine forms. Indeed the spination on *T.bolivianus* is so variable that it is not a good distinguishing feature.

.....from H.Middleditch

In the picture of *T.bolivianus* taken by K.Gilmer at an altitude of 2000 m at about 8 km south of Hualfin, the segments are more barrel shaped than cylindrical and are largely composed of tubercles distributed more or less uniformly over the surface of the segment. The upper part of each tubercle is blunt but the lower portion tapers downwards so that the areole at the apex of each tubercle faces between half-upwards and nearly horizontal. There appear to be between three and six spines per areole, all very slender, fairly long, and many not entirely straight. These pale-coloured spines point in various direction between upwards and outwards. In general appearance the plant in this picture bears a surprisingly close resemblance to the plant which I am growing of *Tephrocactus* species *Arrequentin*. This plant has been seen in several other collections, all probably emanating from the cutting or cuttings brought along by R.Kiesling to our Chileans' Weekend when he was on detachment to Kew. There is a place called *Arrequentin* on the road running west into the Andes from Jachal. province San Juan, which will be at about 2000 to 2250m to judge by the contours on the AGS map.

.....from K.Gilmer

This plant was indeed found at that place by Kiesling. It is hardly surprising that it looks similar to the *T.bolivianus* from near Hualfin, because the *Arrequentin* plant is also *T.bolivianus*.

.....from J.Lambert

It is hardly surprising that you should have observed a good similarity between Kiesling's Fig.12 of his *Tephrocactus* monograph and the plants which he gave away when he was in England, because this is exactly what they are i.e. *T.bolivianus*. I observed quite a lot of these plants along the road above *Arrequentin*. It is a very common species at higher altitudes.

.....from H.Middleditch

In his *Kakteen in Südamerika*, Ritter describes the segments of *T.bolivianus* as usually egg-shaped, 6 cm long by 5 cm in diameter, smaller in some places and larger in others, with tubercles prominent or less so. He also gives the spine colour as white with yellowish-red ends, going grey later, never dark, or black, or clear yellow or brownish-yellow. Several of the comments recorded above, accompanied by the slides of those same plants in habitat, were presented at the Chileans 1997 Weekend, The segment size variation quoted by Ritter was quite evident from that commentary, but segment shape varied from virtually globular through squat egg-shape and more elongate egg-shape to slightly barrelloid cylindrical. There was also a range of spine colours to be seen on the habitat pictures, including yellow, brownish-yellow and reddish-brown. Although Ritter says the spines are "never packed close together, upright", spines arranged in this very manner were also to be seen on the habitat pictures. These examples demonstrate how present-day knowledge of the variation in this species makes it very difficult to write an all-embracing description which would not be equally applicable to other Andean *Tephrocacti*. The alternative approach is to give each and every variant its own name. If this is to be avoided, then several existing names will almost certainly need to be considered as synonyms of *T.bolivianus*.

.....from G.Charles

The spination on *T.bolivianus* is undoubtedly very variable, but on the other hand, the plants we saw in flower displayed only yellow blooms - pale lemon yellow, rich yellow, or even somewhat brownish yellow.. We probably saw flowering plants at every site where we met with *T.bolivianus*. These plants must have a fairly long flowering season as many of them carried buds, flowers, and fruit on the same plant. Looking at my photographs of *T.bolivianus* where a fruit can be seen, most fruits had a ring of areoles around the edge of the floral scar. All the fruit we saw were green, a more or less glossy green. If the fruit had been on the plants for any length of time I expect that they would have started to turn yellowish or brownish. I spent quite some time at various locations removing fruit and cutting it up as I hoped to be able to collect some seed. But despite the number of fruit that were opened, not one of them held any ripe seed. It does seem likely that the flowering season may have started not long before the time of our visit.

.....from R.Ferryman

Despite the great variation in the length and disposition of the spines, the flowers on *T.bolivianus* usually seemed to project out above the spines. On the other hand, the fruit always seemed to be down in among the spines. Of the many hundreds of hummocks which we must have seen of these *T.bolivianus*, we seldom saw more than two or three flowers out on any one of them - even on the biggest plants. And yet on most of these plants there were a great many fruits and buds. So if they only opened two or three flowers each day, then these plants must have been opening their flowers for at least the two weeks before the time of our visit, if not longer.

I still have a few examples of fruit from which I cut a section and then pressed it. None of the fruit which I took off these plants would be any larger than roughly an inch across and I would think this would be about the size of most of the fruit seen on these plants.

.....from K.Gilmer

Not everywhere where we ourselves found these plants did they carry either flowers or young fruit. In many areas it appeared to us that the plants were remaining sterile in that particular year. On the upper rim of the floral scar there are indeed areoles arranged in a ring. During the ripening of the fruit the middle part of the fruit does indeed change, in that its diameter increases. The outer margin of the floral scar however does not change in diameter during the ripening of the fruit - or only very slightly. So the floral scar does retain the same size even when the fruit becomes considerably larger.

.....from H.Middleditch

In Chileans No.51 there was reproduced from Ritter's Kakteen in Südamerika his commentary on *T.bolivianus*. This included the observation that this species occurred more or less between altitudes of 2700 to 3700m. It may be as well to bear in mind that Ritter did a considerable amount of travelling and collecting in Bolivia and Chile, rather less in Peru, and a decidedly limited amount in Argentina. It may be reasonable to assume that Ritter's comments about *T.bolivianus* are based mostly upon his observations made in the course of his travels in Bolivia. Climatic and vegetational zones descend in altitude with increasing distance from the equator so that a 2700 to 3700m zone in Bolivia would become lower in travelling south through Argentina.

.....from K.Gilmer

In travelling up the Quebrada del Toro we first met with *T.bolivianus* at Km 76 (TG 18), some 6 km to the south of Puerta de Tastil, at 2600m.

.....from G.Charles

In the Quebrada del Toro we first came across *T.bolivianus* at Km 67, GC 162. We do not have an altitude record for this location but it was probably slightly lower than 2500m. In the course of crossing the mountains between the altiplano and Quebrada Humahuaca, we came across *T.bolivianus* at about 4,000 m altitude very close to the top of the pass of Abra Potrerillo.

.....from M.Nilsson

When visiting the Quebrada Humahuaca in November 1990 we made an overnight stop at Purmamarca and then set off the following day to walk up the road going over the mountains. Some hours later we were able to hitch a ride on a small truck which took us almost up to 4000m. At El Quemado, which was at 3800m we decided to pitch camp. We searched for cacti but could only see a densely spined *Tephrocactus* MN 192. The fruits were really quite huge. We called the plants *Tephro plommon* in Swedish which means plum *Tephrocactus*. The fruits are yellow, very few scales with glochids, and as big as a plum.

.....from H.Middleditch

The print of MN 192 in habitat, received from M.Nilsson, is of a plant comparable to that pictured by G.Charles from a similar elevation along this same road across the mountains. In consequence it might be reasonable to identify MN 192 as *T.bolivianus*.

.....from R.Hillmann

In the north-west of Argentina these hummock forming sort of *Tephrocacti* are very common. As we climbed over the Nevada de Acay from La Poma to San Antonio de Los Cobres we noted this species occurred up to an altitude of 4700m! This form has very long, brownish-yellow coloured spines.

....from K.Gilmer

Then of course there was our sighting of this species near Hualfin at an altitude of 2000m, which is much further to the south. In the south of Catamarca most plants of *T.bolivianus* are to be found growing between 2600m and 3000m.

.....from H.Middleditch

What sort of surroundings existed where *T.bolivianus* was to be found growing?

.....from G.Charles

I have had to think back and remember the places where *T.bolivianus* grew. I would say that it usually grew on moderate slopes, not on very steep slopes or cliff faces. It was sometimes on gentle slopes and even very occasionally on flat ground. It seemed to prefer to grow on stony or gravelly ground, and although there may well have been sparse tufts of grass and a few low bushes growing in the same area, it really grew out in the open. Where ever we saw it, it was a very common plant, except in the very dry area near Puerta Tastil. We did not make any attempt to think about how many of these plants might have been in view, because there were far too many of them. By comparison, *Tephrocactus hypogaea* often grew on the flat and even in sand. It was also far more consistent in appearance than *T.bolivianus*, but even this displayed variations in spine length.

.....from K.Gilmer

The question arises whether there is a single feature which can be said to be typical for *T.bolivianus* and which occurs in every example. It has to be accepted that this does not happen. In order to describe and determine this species clearly, it is probable that a combination of several characteristics is necessary for *T.bolivianus*. For example, "flower colour yellow" certainly holds true in most instances. but not quite on every plant. Therefore the description must be expanded to "flower colour mostly yellow, rarely also orange or pink". Similarly the form of the segments is not exactly "always egg-shaped" but "mostly egg-shaped, but also elongated egg-shaped, globular, or depressed globular".

And these instances are not only confined to purely morphological characteristics, but on the contrary for example to the nature of the habitat. *Tephrocactus bolivianus* is frequently to be found flattish sloping mountainsides, as in the Quebrada del Toro; but also on steep rocky slopes, such as at Chascuil, west of Fiambala; as well as on the level high plateau of the puna or altiplano. such as around San Antonio de los Cobres.

All in all, *T.bolivianus* is certainly a very difficult species to circumscribe. It occurs over a huge area of distribution with an immense number of individuals. We cannot claim that we really know this species well and will always be able to recognise it immediately, since up to now we have seen only a small selection of specimens.

.....from H.Middleditch

The variation in the spination and segment form which can be observed on *T.bolivianus* in habitat, was reviewed at the Chileans '97 Weekend, with pictures of individual segments in close-up received from G.Charles, R.Ferryman, and K.Gilmer.

COPIAPOA VARIISPINATA? from R.Ferryman

One of the contributors on this subject suggests, in Chileans No.53, that it did not look very practical to get a vehicle from the coast road up to the entrance to the Quebrada Izcuna. I would be in full agreement with that observation. The only practical way of getting a vehicle from the coast road to the Quebrada entrance would be to follow the wash which forms the dry river bed. This is the route which must have been used by the vehicles bringing the produce of the Izcuna mines to the coast road after which they would then presumably follow the coast road. I say Izcuna "mines" advisedly as my understanding is that there are three different locations in this area, all called Mina Izcuna, which have been worked on an adhoc basis. but did not appear to be active at the time of my visit. There were faint traces of vehicular passage in the sand and gravel forming the lower section of the wash from the Quebrada, but it would have required preparatory work to enable vehicles to use that route again. My own vehicle was driven alongside the wash far enough to be more or less out of sight from the coast road but owing to the soft nature of the ground I would not have been happy to take it any further inland.

From there, I started to walk up the Quebrada Izcuna. After perhaps two kilometres there was a side quebrada coming in from the north, joining the main quebrada which continued to run eastwards, further into the coastal hills. From my map and the lie of the land it looked as though this side quebrada coming in on the north side might offer a practical route to gain access to the higher ground between the Quebrada Izcuna and the Quebrada Botija. From there it might then be possible to descend into the Quebrada Botija. This indeed proved to be the case, there being a trek of four or five kilometres over the saddle between the two quebradas; there was rising ground inland of the saddle and a high ridge lying between the saddle and the coast. Once across the saddle a descent was made down the side of the Quebrada Botija, which is fairly steep but negotiable with care and an occasional steadying hand. The Quebrada Botija was followed back towards the sea for perhaps two or three kilometres but I did not wish to return by the coast road so climbed up to the saddle again. From there it was a trek of perhaps six km or along the side of the coastal ridge, back to the Quebrada Izcuna.

The problem of identifying stopping places is best accounted for by the absence of any road signs. Names are purely map references and nothing exists on the ground to confirm many of these. Our first contact with RMF 53 growing on the sandy plains sloping down to the sea, was when travelling south from Blanco Encalada. A kilometre reading on the vehicle suggested that we were near the map reference of Caleta Botija, but it might equally have been Punta dos Reyes, However, at the RMF 53 location there was a quebrada running north-east a little further back towards Blanco Encalada so we deduced this was the Quebrada Botija. On the more recent trip this location was approached from the south, when the round trip described above was undertaken.

Plants which I take to be RMF 53 were seen growing in rocks throughout the area crossed by this circular trek. They did grow in different surroundings, either rock or sand, but nevertheless the plants had the same appearance in either situation. It was on the sides of both Qu. Izcuna and Qu. Botija where I found the plants I take to be Copiapoa variispinata, which as I indicated before, is not the same as RMF 53. In my opinion RMF 53 is Ritter's Copiapoa rarissima. Also within the Quebrada Izcuna is yet another Copiapoa which I took to be different to both the foregoing sorts, and not one that I could easily put a name to. It was suggested by N.Taylor on his visit to this area that it might be a new species. I regret I have never collected material of this third sort and am therefore unable to check my first impressions.

I have not encountered mist in the area of these two quebradas during my visits there. The vegetation in that area suggests to me that mist is not a common occurrence here, more in keeping with the areas immediately to the north around El Cobre and immediately to the south. From this area to Paposo the landscape remains barren and although I have slides of mist forming in these higher hills it is not evident from the flora that it is a regular occurrence, as it is for example in the area of Paposo and Esmeralda.

THE QUEBRADA BOTIJA From A.W.Craig

We had planned to depart for a further trip to the northern part of Chile in November of 1996. As we were standing at the door with our luggage at the ready, waiting for the taxi to arrive to take us to the airport, there was a telephone call from H.Middleditch. who had just received a letter in the mail from Australia, containing one or two useful bits of information from R.Schulz, who had visited the Quebrada Botija earlier that year. In the event, we were able to follow our plans for taking a closer look at the Quebrada Botija. We hoped to find out more about the neat hummocks of Copiapoa we had seen the previous year close to the coast road at Caleta Botija, and to explore some part of the Quebrada Botija itself.

We arrived at the entry to the Quebrada Botija rather late in the afternoon and quickly found ourselves a camp site. A short distance further into the broad mouth of the Quebrada, we saw a tent pitched alongside a car. On walking over to make their acquaintance we discovered the party consisted of a Swiss doctor and a German student doing research on Calceolarea. They mentioned that they would like to find Miguel Diaz, but the maps they were using were rather elementary for field work. We arranged to make the ascent of the Quebrada Botija in company with them on the following morning.

Setting off the next day into the quebrada we followed the dry bed, strolling along for about a couple of kilometres at which point the quebrada started to curve round and take us in a southerly direction. A good km or so further on, the main quebrada now curved round towards the east again and here we found a narrow side quebrada or gully coming in from the south. The main quebrada had been V-shaped so that most of the time

we were unable to have sight of the tops of the surrounding mountains, but at this junction with the side quebrada we had a rather better view and we could see the mist lying over the tops of some of the peaks.

We suspected that this side quebrada might lead us up on to higher ground and possibly in the presumed direction of Miguel Diaz. So we then turned into this side quebrada which was rather narrow and winding so that in many places we could hardly see 30 yards ahead. It was very rough and rugged; we were obliged to negotiate rocks of varying sizes from large boulders downwards, partially blocking the way up the floor of the quebrada. Roughly half way up this quebrada (as it turned out) we came to a dry waterfall about twelve feet high which formed a vertical barrier between almost vertical side walls. My wife decided to stop at this spot in order to sketch the quebrada whilst the other three of us climbed over this obstacle.

Shortly after we had entered this narrow side quebrada we came across some small plants of *Copiapoa atacamensis* as well as a clump of about five globular heads, growing on the rocky sides. Although it was pleasantly warm when we set off on our trek, just before the dry waterfall it had become quite cold. Here we came across a single headed *C.atacamensis* and a *Neochilenia floccosa* of roughly the same size, growing close together. A little further on, there was a three headed *C.atacamensis* growing on an almost vertical rock face, each stem a good foot or more in length. They had evidently been more or less horizontal in their young stage of growth and were now curved so the heads were almost upright, with white farina on only the top quarter of the body. Here too was *Neochilenia floccosa*, about 2 inches in diameter. The steep rocky sides of the quebrada cut off any view above the sides and it was so narrow that there could have been more plants on ledges which could not be seen from the dry bed of the quebrada. Then on steeply sloping and quite sandy ground, with odd stones, another *C.atacamensis*.

At the crown of the quebrada, as we were approaching the more open ground, it became more gritty underfoot. Here we saw an old plant of *C.atacamensis* with a dozen or more heads, up to 15 inches long. About 2 km after we had left the main quebrada the gradient began to ease, the ascent became less narrow and rugged, as we came out on to sloping ground between hills on either side. This sloping ground, several hundred yards broad, would presumably extend to the saddle over to the Quebradas Izcuna. We now see a great number of *Copiapoa solaris*, clumps scattered roughly a stone's throw away from each other. We had seen a few *C.solaris* in the very last part of the quebrada, plants with up to 10-12 heads, and now there was still the odd plant of *C.atacamensis* between the large clumps of *C.solaris* on this flatter ground above the quebrada.

Very shortly we became enveloped in a misty cloud which limited visibility to something like a couple of hundred yards, the visibility constantly changing as the mist swirled back and forth. This was the only place on the ascent where we had found ourselves in the mist. The other two now expressed their intention of trekking off into the mist, where all sense of direction can become lost, so I insisted that they took my compass as I wanted to retrace my steps so that I had time to stop on the way back in order to take notes and photographs.

On re-entering the top of the quebrada the mist was left behind; looking across to the far side of the main Quebrada Botija, the mountainside was covered with a sandy looking surface, rather like the photograph 171 in the Schulz and Kapitany *Copiapoa* book. On the way down we particularly noted that some of the *Neochilenia* were certainly not as floccose as others, even though we saw only a few *N.floccosa* during this trek. It had been pleasantly warm when we started out that morning, but when I had climbed down the dry waterfall I found my wife had been obliged to don all our spare cardigans and jackets because of the cold.

Returning down the main valley we discovered a small spring of water entering from one side of the quebrada, with a concrete cill to hold back a few pints of water. There were still the odd plant or two of *C.solaris* here and there to be seen on the rocky walls at each side. It was very difficult to get up the steeply sloping sides in order to photograph any of these plants and just as difficult to perch safely on the rock and hold the camera with both hands.

Then we turned west again with the main valley and now we find open clumps of short columnar heads of a *Copiapoa* which may be Ritter's *C.variispinata*. There were very few young plants of this sort to be seen but the smallest one we saw was a younger plant with only two heads, each about 4 inches across and somewhat taller than broad, with 19 to 20 ribs similar to the older plants of this sort. We did find a small *C.atacamensis* on a shelf 20 feet above the bottom of the valley, with a clumping plant of *C.variispinata* growing on a wider shelf only a yard or so below. There was then another tatty clump of *C.variispinata* with perhaps 18 ribs per head.

Approaching closer to the mouth of the quebrada and the shore, we reached a point where we now found growing together both the loose untidy clumps of *C.variispinata* as well as the close packed neat hummocks of heads with 13 to 14 ribs which we had come across the previous year, growing at either side of the coast road. So there was an overlap of these two forms, but only over a short distance.

In the Schulz and Kapitany book on *Copiapoa*, the open clumps of semi-columnar heads in photographs 169, 170, and 172 would appear to be Ritter's *C.variispinata*, whilst photographs 165, 166 and 167, entitled *C.variispinata* by those authors, which have been seen by various travellers at Caleta Botija, probably require another name.

.....from R.Ferryman

It is the very last-mentioned plants, my RMF 53 which can be seen alongside the coast road in this locality, which I thought Ritter must have given a name to. I considered *Copiapoa rarissima* as a possible name but these plants do not fit the original description and Ritter's field notes show *C.rarissima* to come from south of Paposo. I conclude that this species does not have a name.

[The routes taken in both foregoing accounts are within the "Miguel Diaz" map, Chileans No53 p90]

SOME SMALL SEEDS OF DOUBT? From J.Brickwood

There was an article in the C. & S. Journal (U.S.) in 1990 in which Kiesling and Ferrari proposed a marked reduction in the number of species names for *Parodia*. However there seems to me to be good cause for having serious reservations about some of the proposals. To start with, the authors lump together more than three dozen species names into what they consider to be *Parodia microsperma*. These plants are stated to grow between 500 m and 1600 (-2000) m altitude, the yellow flowering sorts occurring at lower altitudes, the red flowered populations at the higher elevations, and the intermediate colours at intermediate altitudes.

A further dozen sorts of the small-seeded types of *Parodia* are also lumped together as a subspecies *horrida*. These are stated to grow at altitudes of between 1600-3000 m elevation and to have yellow flowers "except red flowers in the description of *P.hummeliana*". There are eight of these species which are already known to have red, orange, or yellow flowers, so that the flower colour description for *P.microsperma sensu Kiesling & Ferrari* would be more appropriate here. To say that the flowers in this group are "yellow with the exception of *P.hummeliana*" is a nonsense. Both *P.weskampiana* and *P.carminata* are listed as if they were small seeded *Parodias*, whereas they belong to the group of *Parodias* with somewhat larger seeds, which display distinctive testa cells, and which lack the large pale-coloured strophiole which is such a distinctive feature of the smaller seeds of this genus. In addition, *P.fuscato-viridis* and *P.gutekunstiana* have nothing to do with the *horrida* group in which they are placed.

Then there is Kiesling's treatment of *P.setifera*, which again is a small-seeded *Parodia* which he places in to synonymy with several larger-seeded *Parodia*. Not only that, but *P.setifera* is a dwarf in comparison with the so-called synonyms. The photograph in Kiesling's article of both the plant and the seed look as though they belong to the *Protoparodia* group with the larger, coarsely tuberculate seeds. The seed is quoted at 0.7 mm long! I can only assume that Kiesling must consider that Backeberg's original *P.setifera* was something quite different to what everyone else seems to consider it is, today.

...from *Blatter fur Kakteenforschung*, 1934 - 7, by C.Backeberg.

Parodia setifer Bckbg sp.nov.

Small, usually low bodies with about 18 narrow, 6 mm high ribs, dark green. Areoles elongated, with little wool, whitish at first, 6 mm apart. About 20 pure white radial spines, up to 8 mm long. Central spines 3-4, flesh coloured to black, one hooked, later falling off; at first all arranged in tufts in the crown. Buds with white hairs. Flowers 3.5 cm in diameter, whitish yellow. Fruits small, seeds rather small. Salta, around 2600m.

...from H.Middleditch

Almost all the small-seeded *Parodias* tend to give me the impression of having a set of tubercles very regularly disposed, not vertically one above the other, but in a spiral arrangement. To a greater or lesser extent, each tubercle seems to arise from the general body surface, rather than be formed out of a rib which has been divided up by transverse notches. However, in Backeberg's B.f.K. the above description of *Parodia setifer* is accompanied by a photograph which gives an immediate impression of a plant having a series of vertical ribs; not only because the areoles are arranged in a set of vertical lines, as opposed to spirals, but also because it is just possible to see that the areoles are indeed standing on ribs, rather unlike the tuberculations on the general run of the *Parodia* which have the *microsperma* type of seeds. So that this photograph might have suggested to Kiesling the sort of plant which is not found on the easternmost slopes of the Andes, a location which many authors now appear to accept as the home of *P.setifera*.

It is quite probable that the several new *Parodias* published in the early 1930's in B.f.K. were the result of collecting trips undertaken for the purpose of obtaining plants for the commercial nurseries in Europe. By this time, trekking across country on horseback had been replaced by using a motor vehicle. A great many of these commercially collected plants would probably have been dug up at no great distance from a highway, since it minimised the task of humping weighty sacks of plants for an appreciable distance back to the vehicle. So it is possible that *P.setifera* was found at no great distance from a road which was passable for motor vehicles in the 1930's.

Even nowadays roads through *Parodia* territory over the eastern Argentine Andes are limited in number. From the Chaco side of the Andes the roads over the eastern ridge of the Andes into the Salta basin do not rise above 2000m. If the altitude of 2600 m quoted by Backeberg for *P.setifer* is indeed correct, then Kiesling was right to place it in the Calchaqui valley, north of Cafayate where nowadays roads passable with motor vehicles do reach this sort of altitude. But was the Calchaqui valley open to motor vehicles in the mid 1930's? If *P.setifera* was really found at roughly half that altitude, then it would be virtually impossible for it to occur in the Calchaqui valley and the present accepted location would be far more feasible. So how can we establish where it was really found?

Travellers in south america in the earlier part of the nineteenth century often made reference to carrying with them a mercury barometer, or sometimes an aneroid barometer, for the purpose of establishing altitudes with a reasonable degree of accuracy. In the nineteenth century collectors and natural history writers travelled on horseback with accompanying mules and servants to handle camping equipment, provisions, and collected material. The commercial collectors who were active in south america in the inter-war period made use of motorised transport. Not infrequently they had a travelling companion but normally just the one vehicle. Their vehicle had to carry themselves, their camping equipment, and provisions, as well as the load of cacti which they were collecting for commercial disposal in Europe. Because a record of precise habitat altitude was not a sellable product, it is unlikely that these collectors troubled themselves with carrying expensive items like barometers; hence location altitudes quoted for many of these plants are at best a guesstimation.

As usual with new descriptions of this era, where habitat data normally ranged between vague and

indefinite, no specific finding location is given in B.f.K. for *Parodia setifera*. The habitat elevation for *P.setifer* is given as 2500m in the Latin and as 2600m in the vernacular (on the same page). Other new *Parodia* spp. published in B.f.K. at about this same time were *P.mutabilis* (2500m in the Latin, 2800m in the vernacular), and *P. aureispina* (2500m and 2800m respectively). Bearing in mind current ideas as to the locations of these sorts, it does appear to be quite possible that all three were originally collected at no great distance from each other. If any one of these three species can be positively located from a contemporary account of a collecting trip, and an altitude established, then it may be possible to compare an actual habitat elevation with that quoted by Backeberg in the original description, at least in general terms.

.....from J.Brickwood.

In his *Parodia - 2*, Weskamp observes that Brandt's stated locations for *P.aureispina* and *P.mutabilis* and their varieties, are pure invention, and that the true type location remains unknown.

....from F.Vandenbroeck

When I left for Argentina on my first trip there in 1985, I expected to find many more *Parodia* than I actually saw. My experience seems to bear out Ritter's view, that (apart from *P.maassii*) their habitats seem to be very limited in extent and to find them you have to come upon them by luck or you have to know the exact spot where they occur.

A CACTUS COLLECTING EXPEDITION IN SOUTH AMERICA By H.Blossfeld From G.B. Cactus Journal Dec. 1935.

From the horticultural point of view it was important to search for and introduce rare or new species in order to stimulate the interest of cactus lovers. The offer from Marsoner to make the journey to south america jointly with me was the final inducement to undertaking an exploration and collecting trip. ... After we had struggled for weeks in exasperation over the release of my equipment by the customs, we went on to the province of Cordoba. we then made a digression into the mountains of San Luis. One rise was so steep that we had to unload, proceed up empty, then carry up the whole of the baggage, including several hundred kilos of cactus plants, and reload above. we then went west into the province of La Rioja ... after which we travelled in a great semicircle to Catamarca.

From Catamarca we went northwards into the province of Tucuman. We made no halt in Tucuman, but went on to Trancas where we had to await repairs to our truck. Here we found giant specimens up to 10 m high of *Cereus terscheckii*. On shining red sandstone hills we found a *Lobivia* which may be identical with *L.hyalacantha*. But, according to the not very reliable reports of the natives, it should have a dark violet flower. But there was nothing more here in the cactus line to collect. Also the road came to an end and so we could not penetrate the western hills, in which I expected to find cacti. We had to turn and go to Salta. In this magnificent region we found the beautiful *Echinopsis* No.37 and the extremely rare *Parodia aureispina*, related to *Echinocactus microspermus*. The true form of this lovely rarity with the golden spines only occurs in one single spot. It can be found in a few other places also, but the spines are only partly golden in a degenerate or hybrid form.

The true and most beautiful form grows only on one almost vertical rock wall in the cracks of the slate. I had to climb up and let myself down from above between horribly prickly clumps of *Bromelia* and a sort of succulent stinging nettle, extremely painful to touch, to hack the little *Parodia aureispina* out of the rock walls. This was the most difficult and dangerous piece of collecting we had had to undertake so far. Our task was to ascend the sun-drenched northern wall, which was covered with wasp's nests, and on the way up I disturbed a poisonous snake like a common viper, so that great caution was necessary. It is not easy to collect these small plants under such conditions. I had to rope myself to a bottle tree, as one could not reach the plants otherwise, and so I hung defenceless on the rope, the victim of wasp attacks if I unintentionally disturbed a nest. It is understandable that I could collect only a few specimens of this beautiful species. They were gathered for the first time a few years ago by a collector from whom the author received plants.

.....from H.Middleditch

This collecting trip which is described by Blossfeld had first visited cactus country in Cordoba, San Luis, La Rioja and Catamarca provinces. They then headed for Salta. At that time it is unlikely that there were any roads suitable for wheeled vehicles running from the Pipanaco basin into the Santa Maria valley and thence to Cafayate and Salta. In order to get to Salta from Catamarca it was therefore necessary to first drive north up the foot of the eastern flank of the Andes, via Tucuman

The party made a halt at Trancas, in northern Tucuman province. It was only a few years prior to Blossfeld passing this way that Fric had paid a visit to "Qualinchoy" and there found some "Microspermia". Information about this visit had probably already filtered through to Blossfeld. Fric did not make use of a motor vehicle for his collecting trips, but did quite a lot of travelling by train. Fric probably took the train to the station at Trancas and then rode on horseback along a trail into the hills, as far as Hualinchay. This may have been the road "into the western hills" that Blossfeld could not follow by motor vehicle, and so turned to take the traditional road to Salta.

At this date it is also unlikely that there were any roads suitable for wheeled vehicles from the Chaco side of the eastern flanks of the Andes, over the Calchaqui ridge into the Santa Maria or Salta valleys and thence to Salta. The old, traditional route to Salta, went northwards through Tucuman, roughly following the margin of the Chaco plain where it meets the eastern chain of the Andes. From Trancas it goes via Rosario de la Frontiera and Lumbreras to the crossing of the Rio Juramento, then shortly before General Guemes it turns westward towards Salta. Thus we need to look for some clue in Blossfeld's account which might guide us as to

whether or not he found his *P.aureispina* (and hence *P.setifera* also) somewhere along this road from Trancas to Salta where it may well occur at an altitude less than that quoted by Backeberg in the original description.

The above account in the GB Journal was evidently translated from the German. Virtually the same account appears in parts in several issues of *Kakteenkunde* for 1936, the above extract appearing in parts in *Kakteenkunde* No.4 and No.5. The tree used to anchor the abseiling rope is there described as a "Flaschenbaum" or bottle tree. It is probable that this is *Chorisia insignis*, "8-15 m high, trunk with a diameter of up to 2 m" which grows in the lower zone of the subtropical selva and in the transition zone between the selva and the dry Chaco vegetation [Trees of Tucuman, Digilio & Legname 1966]. In the forested flanks of the eastern Andes there are very substantial trees, but in parts of the forest - especially the drier parts, the trees are without a substantial trunk. In such situations the swollen trunk of a bottle tree would probably seem to offer the more suitable anchorage for an abseiling rope.

At what sort of altitude would we expect to find the bottle tree? In the account by Burmeister of his ride from Tucuman to San Javier (Chileans No.48) mention is made of the difference between the outward appearance of the lower and upper zones of the forest, both in overall colour when viewed from a distance as well as the more open nature and less substantial growth of the upper zone. A distinction is also drawn by Digilio & Legname [Ibid] between the upper and lower zones of the subtropical forest; the lower zone is said to extend up to some 800 m altitude and one of its typical components is stated to be *Chorisia insignis*, the bottle tree. However, this does not mean that it is completely absent from the upper zone, which extends to some 1500m altitude. Only a few references to this particular tree have been found in the available literature..

..... from J.Frenguelli, Main features of the Phytogeography of Argentina

In the Chaco forest, among the trees of greater size, more abundance, or more characteristic of the Chaco forest, may be cited: the *Quebracho colorados* (*Schinopsis lorentzii*), *Quebracho blanco* (*Aspidosperma quebracho blanco*) *Guayacan* (*Caesalpinia melanocarpa*), *Palo borracho* (*Chorisia* sp.) ...

..... from L.R.Parodi, Trip to the province of Catamarca, Rev. Mus. La Plata Seccion Oficial - 1941

The vegetation which predominates in the valley to the east of the Sierra de Ambato, extending up to more than 1200 m over the mountain slopes, is a mixture of species from the Chaco and the Monte. From the first it includes typical species such as the *jarilla* (*Larrea divaricata* and *L.cuneifolia*), the *Retamo* (*Bulnesia retamo*), the *Brea* (*Cercidium praecox*), the *Manea Caballos* (*Tricomaria Usillo*) etc., and from the second, the *Quebracho Colorado* (*Schinopsis lorentzii*), *Quebracho blanco* (*Aspidosperma quebracho blanco*), the *Mistol* (*Ziziphus mistol*), the *Palo Borracho* (*Chorisia insignis*)

.....from H.Burmeister, Trip through the northern provinces of the La Plata states,

[Ascending the Sierra Graciana from the Catamarca valley] No water flowed in the gully but ... there was an extremely striking vegetation on the steep sides. Never had I seen such an interesting sort of forest in the whole of the land of Argentina, as this one. The barrel tree surprised me most of all; a species of *Bombax*, related to *Bombax ceiba*, whose trunk swells up in the middle with advancing age and then assumes a fully spindleform shape. I saw here numerous examples of this curious growth in all sizes; the natives call it *Jachan*. In youth - 2 to 3 feet in height - the stems are smooth, green, and cylindrical like any other trees, but soon they start to swell in the middle so that stems 4 to 5 feet in height have already developed a really distinctive central swelling. Later it becomes a 2 to 3 feet thick belly-like swelling, that is just like many a very long barrel. So fully grown old trunks are rarely more than 8-10 feet tall and divide at the top into a few slender branches; these carry the canopy which is more flat than tall, ornamented with large pale yellow flowers that stand near to the mallows. Certainly the flowering period for this tree was over; most of the flowers lay spread on the ground and there were only one or two still on the tree.

To this unusual form of stem belongs an equally striking surface. From the young and still green bark of the slender tree there grows out stout wart-like thorns, which with increasing swelling of the stem are swallowed up by the deep clefts in the greying bark. Then the stem looks as if it is covered with scabs. The leaves always sit 5 at a time at the end of a stalk and the fruits are long capsules, whose seeds are wrapped in a soft, silky white brush of hair. I have seen this tree distributed nowhere else except here in the narrow rocky gully in the Sierra Graciana where it occurs frequently but always stands alone, scattered between other quite different sorts of trees. It is often over 100ft up on a prominence on the steep rocky wall, rarely below on the valley floor. There was no other tree with special peculiarities that was obvious to me. Cacti were not prominent here although numerous elsewhere and likewise I noticed the absence of the *Algarrobo*.

.....from D.Angus

Over the winter of 1991/92 I sowed some seed of *Chorisia* sp. which germinated quite well. So well, in fact, that it was only a matter of weeks before the seedlings were planted out into pots. In the Spring of 1992 I put one of these seedlings into a free root run in a bed; it grew so fast that by the end of the year it was nearly up to the roof of the greenhouse, which I had deliberately built with a good headroom to be able to accommodate cereiform cacti. In early summer of 1993 I had to prune several of the uppermost branches off the *Chorisia*. The branches are rather like bamboo, with a robust outer wall and a soft, pithy, centre. The main stem tapers upwards from about three inches diameter to less than an inch across; it carries numerous thorns, very similar to rose thorns. How tall does it have to be before it will flower?

..... from H.Middleditch

It would appear that the bottle tree is really indigenous to the Chaco plain and perhaps only occurs spasmodically on the lower levels of the mountains. For Burmeister to have seen no bottle tree when he was crossing the Chaco plain nor in that part of the Selva which he visited near Tucuman city, might suggest that it is not exactly prolific. Do we have any record of its occurrence from Tucuman northwards, which is the area in which *P.aureispina* was probably found? This may establish whether the possible 1200 m upper limit for the occurrence of *Chorisia insignis*, as indicated by Parodi, is typical for its whole range of distribution

There is an account by Kuhn & Rohmeder in a Tucuman University publication of a trip east from Tucuman city towards Abra Infernillo. In this account, the bottle tree is mentioned only once. It was seen growing at about 1100 m altitude (to judge by the context). The northern slope of the valley, facing south, carried a forest in which there were corpulent trees; by inference, those trees in the gulleys on the grass-covered north-facing slope were more scraggy. By comparison, the bottle tree would probably look the best abseiling anchorage here. Is this sort of vegetation to be found elsewhere in Tucuman, or further along the road to Salta?

**VEGETATION OF THE ARGENTINE REPUBLIC By P.G.Lorentz 1876
(In R.Napp, The Republic of Argentina).**

The subtropical formation owes its existence to the high ranges of the Cordilleras and their branches, which stand in the way of the winds that come from the Atlantic ocean and cause them to drop their humidity in the form of rain. This vegetation only exists in regions where the mountains are both sufficiently elevated and also directly in the way of the damp winds. At those places where other mountains are to windward, the subtropical formation cannot develop or else it is very limited. This is shown in the valley of the river Tala, with the Sierra Candelaria to the eastward. Here the subtropical woods are only seen on the slopes whilst in the depths of the valley the Monte formation appears. Yet the eastern flank of the Sierra Candelaria is clothed with magnificent tropical forest. ... In the north the subtropical formation passes into the Bolivian tropical forests. These woods are composed of the same elements which we have observed on the mountains and their slopes of the province of Tucuman, mixed with some other new species. It is difficult to determine the height to which they reach, because it depends not only on the altitude, but also upon other factors, such as the situation and steepness of the slopes.

Above the subtropical forest we find the Pine - *Podocarpus angustifolia*. It is very characteristic in the valley of Tarija, and on the eastern flanks of the Cordilleras to the west of Oran. There are isolated specimens in the chain of Aconquija, but it is more frequent on the precipitous slopes above the subtropical forest in the Alto de Salinas in the Sierra de Candelaria. The Aliso (*Alnus ferruginea*) forms thick groves upon the precipitous slopes and in the deep ravines and is very similar to the European alder. Bushes among the Aliso are rare, being limited to some high spp. of the genus *Eupatorium*.

....from L.Brackenbusch, Vegetation of the Northwestern parts of the Argentine Republic, Petermann's Geographische Mitteilungen Vol.39 1893

The subtropical forest occurs on the eastern slopes of the outer mountains in the provinces of Tucuman, Salta, and Jujuy.

.....from The Main Features of the Phytogeography of Argentina By J.Frenguelli Revista del Museo de la Plata (New Series) Vol.3, Botany, No.13 1940

The subtropical mountain forest, or Selva, occupies a narrow belt which runs northwards from Aconquija via the provinces of Tucuman, Jujuy, and Salta until it extends over the border of Argentina, at the altitude of the Rio Carapari and at Yacuiba, where it runs into the Yungas of Bolivia. In this extensive tract it occupies exclusively the slopes of the mountains, the quebradas and the narrow valleys, more or less from 400 to 1200 or 1400 m altitude. It occupies only the slopes which face eastwards, since they face the humid air currents which reach them from the distant Atlantic. In turn this brings about the interesting asymmetry and great contrast between the eastern slopes covered with Selva and the semiarid western slopes. This contrast is most marked on the Aconquija and diminishes going north from there. On the other hand, the distribution of the Selva is more regular on the foothills which start at Tucuman with the Sierras Medina and Candelaria, continue in the Sierras of Lumbrera and of Santa Barbara, and passes on into the tropics in the direction of Bolivia, with the Sierras Alto and Aguargue. This formation clothes hillsides formed of precambrian schists, predominantly sandstone or silt.

Within the body of this formation there are no other important phytogeographic associations. But, on reaching the upper altitude margin of the Selva, there follow trees which are clearly characteristic of the altitude zone. Starting with a transition zone between 1200 and 1600 m altitude, there next comes an arboreal steppe more or less up to 2500 m in which the Aliso (*Alnus jorullensis*) forms an almost pure association. In places it is mixed with, and in other places partly replaced by, Quenoa (*Polylepis australis*) which occasionally extends up to an altitude of 3000 m, but in the form of small bushes with short, twisted, trunks. In the transition belt grows the Pine (*Podocarpus parlatorei*), the only conifer in the formation, scattered in isolated examples in the south of its distribution area, on the Sierras of Aconquija and La Candelaria, but forming stands in the extreme north, on the eastern slopes of the Sierras of Oran.

.....from The Andean Foreland from Guemes to Villa Montes By H.Kanter Der Gran Chaco und seine Randgebiete. Abhandlung a.d. Geb. d. Auslandskunde XLIII 1936

North of the plain of Metan there arises a further isolated mountain mass, formed of several parallel chains, and also separated from the mountains to the west by an elongated valley, in which flows the Rio San Francisco to the north and the Rio Pasaje to the south. The valley in which the R.Pasaje flows is particularly narrow, with the foothills of the western mountains descending right to the river which in turn runs against the steep slope of the Sierra San Antonio and Sierra Lumbrera. In the dividing valley to the north of the R.Pasaje, the sandy-clayey hills are covered with sparse dry thickets, with Algorrobo, Quebracho, occasional Palo

borracho [bottle tree] and numerous thornbushes, with small patches of bunch grass only here and there. After crossing the highest point at 874 m the valley widens out into the broad plain of Campo Santo, where the railway line to Salta turns west at Guemes and another branch goes NE to Jujuy. The thornbush forest advancing northeastwards from the plain of Campo Santo becomes taller and thicker and to the north of Ledesma gradually changes into a thick forest with trees of 20-30 m in height. In addition to the Quebracho Blanco and Quebracho Colorado, Cebil, Palo Blanco and Tipa, there are still candelabra cacti (*Cereus*) and the Jucan, Palo borracho [bottle tree]. On the mountain slopes it becomes an evergreen rain forest with lianas and epiphytes, whilst the *Cerei* and Palo borracho are now completely absent.

Shortly before Yacuiba there lies the border between Argentina and Bolivia about 60 km before Villa Montes the road passes some km to the east of the foot of the mountains, in a dry forest of Algorrobo, Chanar, Mistal, Quebracho Colorado, Palo borracho and numerous candelabra cacti.

.....from H.Middleditch

The foregoing accounts make a clear distinction between the different vegetation zones to be found on the front ranges of the Andes which face the rain-bearing winds from the east. At a lower altitude there occurs the zone of sub-tropical woodland and above it the zone of the Aliso and Quenoa. The reason for this change in vegetation is directly related to increasing altitude, which gives rise firstly to a decrease in average annual temperature and secondly to a reduction in rainfall. A fairly comprehensive review of the relationship between altitude and humidity on the eastern flanks of the Andes in Tucuman appeared in *Chileans* No.46 under the heading of "Isolated foothills of Tucuman" by Kanter. The above abstracts all indicate that each of the vegetation zones on the eastern flanks of the Andes is very similar in its character and components over a considerable north-south extent. Hence there may be many places within that section of the journey made by Marsoner and Blossfeld between Tucuman and Salta, where the bottle tree may occur.

It is quite clear that the bottle tree does not grow in the zone of Quenoa and Aliso. The lower boundary of this Aliso zone is not a nice neat line at a specific altitude. It is subject to the influences of rain-shadow, gradient, orientation and exposure. But an altitude of some 1200 to 1400 m would appear to be a possible upper limit for the occurrence of the bottle tree, *Chorisia insignis*. At Trancas, Blossfeld would be at 782 m altitude; if he did travel west from there as far as San Pedro de Colalao he would have reached 1100 m altitude. Either hereabouts, or further along his route to Salta, Blossfeld could have collected his *P.aureispina* by abseiling down the steep slope using the bottle tree as an anchor. His route to Salta would be via the plain of Metan, then along that section of the valley of the R.Pasaje described above by Kanter, as far as the edge of the plain of Campo Santo where he would turn west towards Salta. Nowhere close to this route could he have approached a collecting height of 2800 m as quoted by Backeberg in his original description of *Parodia aureispina*.

In his account of his collecting trip, Blossfeld states that they were unable to undertake some of their planned trips from Salta city, owing to roads being washed out. But they did make a visit to Quebrada del Toro. From Salta they then went on to Quebrada Humahuaca. The cacti from the Quebrada del Toro are now fairly well known and do not include *Parodia aureispina*. It seems highly improbable that Blossfeld made a journey into the Cachi valley, which is where Kiesling has placed *Parodia setifera*, due to the roads or trails being unsuitable for wheeled vehicles at that time. So it would appear that Kiesling has picked the wrong plant from the wrong place, to which he has attached the name *Parodia setifera*. So where might it have come from?

PARODIAS COLLECTED BY THE PILTZS, 1976-1980 By W.Weskamp From K.u.a.S 32.8.1981

Further north from Tucuman, specifically near Lumbreras on the banks of the Rio Juramento in Salta province was found another *Parodia*. The *Parodia* P.153 found here is *P.setifera*, whose habitat location was unknown to us for a considerable length of time. It has twice as many radial spines as the other *Parodia* in the macrancistra group, but equally distinctive central spines and similar flowers. Unfortunately it is not to be denied that Ritter's *P.uebelmanniana* comes from the same location and thus is identical with *P.setifera*. There is no doubt about this.

....from H.Middleditch

A further part of this article appears in the subsequent issue of K.u.a.S., this time accompanied by a photograph of a plant of *Parodia* P.153. Placing this photograph of P.153 *P.setifera* alongside the photograph of *P.setifera* in B.f.K., with the two in front of me as I write, they both have one characteristic which is remarkably similar. The areoles are spaced close together, in vertical lines, as if lying on a rib, rather than appearing to be independent tubercles arranged on a spiral. The location near Lumbreras is indeed quite close to the traditional highway from Tucuman to Salta, which was in all probability followed by Blossfeld. It does not lie at anything like as high as 2500 m altitude, more like 800 m altitude.

....from J.Brickwood

Of all the tiny-seeded *Parodias*, only members of the *setifera* group (including *P.betania*, and *P.uebelmanniana*) and the *rubristaminea* group have only slightly spiralling ribs - not far off the vertical. In both groups, the seedlings are more tuberculate with spiralled ribs, but as they grow bigger the ribs become more readily visible and tend to straighten out, sometimes even being vertical. Occasionally the ribs may deviate from the vertical and become irregular. The orientation of the spiralling can be dextrose or sinistral, even within plants grown from the same batch of seed e.g. in JL 295.

Of those small-seeded *Parodia* which appear (at least according to our perception) tuberculate in

intersecting spiral series, several taxon e.g. some members of the *P.horrida* group, actually subtly display suture-like spiralling lines between the rows of tubercles, indicating the orientation of the “ribs”. Coupled with the cross-furrows between the tubercles, not surprisingly the tubercles are then visually rhomboid in form (at least at their base) in such cases. Once again the ribs in these *Parodia* are more noticeable in older plants, but never to the extent of the *P.setifera* and *P.rubristaminea* group.

....from W.Verheulpen

The name *P.chlorocarpa* originally appeared in the Winter catalogua as FR 921, named *P.rufidiamata* v.*chlorocarpa*; later Ritter changed the name *rufidiamata* to *rubelliamata*. Due to the rarity of living material it is quite unclear what this *P.rubelliamata* should look like. New material was collected by Piltz (P.253) and Herzog (DH.113) that displays a habit which suggests that it could be *P.rubelliamata*. However, the species is not directly related to *P.setifera*, whereas on the other hand the named varieties are mostly relatives of the *setifera* group. I am fortunate in having a plant of *P.rubelliamata* v.*chlorocarpa* in my collection, but only if you have seen the *P.betaniana* form of *setifera* can one see the relation to *setifera*. This plant has more bristly spines as opposed to the more stout spines of the real *P.setifera*.

....from H.Middleditch

Piltz P.253 is recorded from the vicinity of El Cebilar, and DH.113 *P.rubelliamata* is from south of El Cebilar, in the Quebrada de Rio de Sauces, at 1800 m. The Ritter material is recorded as follows;

1960 Winter catalogue

FR 919 *P.rubelliamata* sp.nov.
FR 920 *P.rubelliamata* v.*paucicostata*
FR 921 *P.rubelliamata* v.*chlorocarpa*
FR 922

Kakteen in Südamerika

P.uebelmanniana, Lumbreras
Parodia betaniana, Betania
Parodia chlorocarpa, Mojotoro
Parodia aureispina, Mojotoro, railway bridge.

The first three of these numbers are to be found in the 1960 Winter catalogue, where FR 919 is specifically described as “similar to *P.microsperma*, ribbed”, presumably the ribs distinguishing it from the independent tubercles on *P.microsperma*; FR 920 is described as having “less ribs”; FR 921 as being “taller with more spines”. Presumably all three sorts were similarly ribbed, as opposed to being purely tuberculated.

.....from F.Ritter, *Kakteen in Südamerika*, 1980

Parodia uebelmanniana Globose, up to 8cm broad, more or less grey-green, in old age becoming up to two or three times taller, slightly woolly crown; ribs 16-25, about 5mm high, cross-furrowed to more or less half their depth. so that the ribs are readily counted. Habitat, Lumbreras. Found by me in February 1959. Seed of this species was offered in 1960 under the name *P.rubelliamata* Ritt. n.n.. In his *Descr. Cact nova* 1963, Backeberg published his “*Parodia rubelliamata*, found by Fescher” - however this plant is a quite different sort

Parodia betaniana Globose, 2.5 to 6 cm broad; ribs 13 (-16), deeply divided into tubercles. Seed similar to that of *P.uebelmanniana* Habitat, Betania. Found by me in 1931 and again in 1959.

Parodia chlorocarpa Globose, later elongated, 2-5 cm broad; ribs (14-) 15-20, most frequently 17, slightly cross-furrowed, 5-7mm high Seed rather similar to *P.uebelmanniana* Habitat, Mojotoro. Found by me in 1959

.....from P.Down

I do have several *Parodia setifera* from several sources as well as two *P.uebelmanniana*. I can confirm that the tubercles do appear in vertical ribs on both sorts, rather than being arranged in spirals as is common on many of the small-seeded *Parodia*. I also have a seedling *P.chlorocarpa* which also appears to be like this, but until it is more mature I would not like to draw any conclusions about it.

.....from H.Middleditch

Normally one would need to be very cautious in reading either chronological order or any geographical proximity out of adjacent entries in the FR list, but in this instance it appears that the ribbed *setifera*-like plants are to be found in the same general area as *P.aureispina*, at least as far as Ritter’s understanding goes. Bearing in mind that both *P.setifera* and *P.aureispina* were first described in the 1934 B.f.K., as well as *P.mutabilis*, it is quite possible that Backeberg saw all three sorts not long after they were unpacked from the consignment collected by Blossfeld and Marsoner. What information do we have for a possible location for *P.mutabilis*? It is listed in the Lau field number list as Lau 535, but only “Salta” is given as a location.

....from J.Lambert

My understanding is that Lau 535 was discovered near Betania.

.....from J.Brickwood

It is noted by Weskamp in his monograph on *Parodia* that *P.mutabilis*, DH 121a, is from the same location as Lau 535 and occurs at only 8 km away from the location for FR 922 at Mojotoro, at low altitude.

....from H.Middleditch

So all three *Parodia* species described by Backeberg in one issue of his B.f.K. (*mutabilis*, *setifera*, *aureispina*) may well have come from the same general area, around Mojotoro. This is close to the traditional route from the Chaco plains over a fairly low range of hills, to Salta. It is this road which must have been followed by anyone travelling by vehicle who wished to get from the Chaco plain to Salta at about the time of Blossfeld and Marsoner’s collecting trip. Hence it was also the route likely to have been used by whoever had found *P.aureispina* and given it to Blossfeld not long before his own trip.

.....from E.Werdermann, *Bluhende Kakteen*, Plate 127, 1937

Parodia aureispina For the first importation of this fine species to Europe, we are indebted most probably to Fric or Stuemmer. Fric was the first to bring to us cacti from the north argentine-bolivian Andes

in the form of living material. After him this rich area of the Andes was revisited more extensively by a number of other collectors, among whom I would call attention to Stuemmer, Marsoner, Ritter, Backeberg, and Blossfeld.

.....from H.Middleditch

It is quite certain that Fric did not undertake any exploration either in the area around Salta city, or in the that part of the Andean front ranges lying to the east and south-east of Salta. From their own account, Marsoner & Blossfeld were not the first to locate this species. Hence it would appear quite probable that Stuemmer was the first to locate *P.aureispina*.

From the photograph in the GB Journal of the pick-up used by Blossfeld and Marsoner, it appears to have been of about 7 cwt capacity. By the time they had spent a few weeks collecting in Catamarca and La Rioja, it was probably well loaded. In that situation their objective would most likely have been to drive thence directly to Salta from where the collected plants could be crated and forwarded to Europe, Salta traditionally having a reputation as a forwarding point. The stop near Mojotoro may have been made just before reaching Salta, or on an outing from Salta itself. This is the right sort of altitude for bottle trees. Do any bottle trees grow thereabouts?

.....from J.Lambert

The "Mojotoro" story does not look too happy to me. Earlier authors tell us that *P.aureispina* is to be found at 2500 m (Backeberg) or 2800 m (Krainz). Likewise for *P.mutabilis*, which is probably a synonym. In addition, Blossfeld mentions that he found a bottle tree near his location of *P.aureispina*, and he also writes that the latter were growing on vertical cliffs. On two separate occasions I have visited the area near Mojotoro, which is not far from Salta city, and none of the foregoing elements match the landscape and terrain in this area. Nor did I find any *Parodias* there!

In this area the altitude will be somewhere between 1200 and 1300 metres, with a landscape of rather flat country with some hills covered by dense bushes. This is the sort of biotope which might harbour species like *P.setifera*; I could agree that either *P.betaniana* or *P.chlorocarpa* might be closely related to, or even synonyms of, *P.setifera*, although the landscape round Betania is flatter still, with lots of cultivated fields. However, the photographs provided by Ritter (his figs 283 and 284) display surroundings that look like bare stony slopes ... !

It is possible that the *Parodias* grow on the tops of the hills, where the bushes might become more open. I tried to ascend the hills somewhere between Mojotoro and Betania, but unfortunately could not get through to the top. As for the railway, I walked along it for about 1 km, but there was nothing of interest to be found!

Even if there are some *Parodias* in the Mojotoro area, they are likely to belong to the type of plant more or less similar to *P.setifera*; from what Blossfeld tells us, we may infer that *P.aureispina* originates from an entirely different environment, higher and dryer. Moreover, when travelling from Trancas to Salta, you would not pass Mojotoro, as this is situated to the north of the city, whilst you would approach it from the south. However, Blossfeld may have taken the road from Juramento to La Troya and Chamental, and hence passed near the Cerro Ceibalito ... ? But this still leaves a problem, because to find altitudes of 2500 m near Salta, you would either have to drive up the Quebrada del Toro, or to climb the Cuesta del Obispo!

(at a later date) Back to the problem of *Parodia aureispina*. I wrote to Dietrich Herzog to ask his advice on the matter. His reply was slightly puzzling to me, as he told me that *P.aureispina* does indeed grow near the railway bridge over the Rio Mojotoro, just as Ritter states. The altitude there is no more than 1100-1200 metres. Surroundings are rather moist, but the plants grow on a vertical cliff. So I must not have looked in the right place; I shall eventually try to go back there on my next trip.

Herzog also says that he considers *P.mutabilis* as no more than a form of *P.aureispina*, and writes that it is to be found some 5 km more to the north. Finally, he says that altitudes of 2500-2800 metres, as mentioned by Krainz or Backeberg, are quite out of the question, as "such a soft-fleshed and colourful species" could not thrive at that altitude in barren surroundings. Anyway, knowing Herzog, I am now quite convinced that *P.aureispina* does originate from the region of Mojotoro.

.....and later still

In 1993 I finally succeeded in getting to the famous railway bridge on the Rio Mojotoro, where I duly collected a few *Parodias*. These are still very small plants, but I think that they will prove to belong to *P.aureispina*.

.....from H.Middleditch

It now seems to be the generally held view that both *P.aureispina* and *P.setifera* emanate from the lower parts of the Andes roughly north-east from Salta city. In that area there are likely to be hundreds of cliff faces where *P.aureispina* might grow, It would be a pleasant surprise to be able to identify the original location for this species, but the chances of doing so are probably slim. The account of Blossfeld's journey which appeared in the pre-war GB Journal is virtually identical to the text in *Kakteenkunde*, but these are each accompanied by a different selection of illustrations. It is in *Kakteenkunde* for March 1936 that we find the photograph of the cliff face on which *P.aureispina* was found. This appears to have been taken from a vantage point perhaps a hundred yards away, but even then it is possible to see the bottle tree used as an abseiling anchor, growing right on the lip of the cliff. There may possibly be innumerable such places between Guemes and Salta, but perhaps it may be recognised by J.Lambert?

.....from J.Lambert

I have examined the photograph which you sent to me of Marsoner's finding place for *P.aureispina*, as published in *Kakteenkunde*. I cannot place a cliff of this magnitude in any place in Salta which I visited. The only thing I can tell you for sure is that it is not at the Mojotoro railway bridge. As a matter of fact, the latter habitat is an artificial cliff, created by cutting the railway track through the hills i.e. it is rather a small cliff, as one may observe along any kind of sunken road. On the other hand the cliff photographed by Marsoner is a

huge wall of rock, judging from his own figure as indicated by the white cross in the upper part of the picture. The rock strata suggests that it may be a natural cliff, or possibly an artificial one resulting from some extensive and earlier quarrying?

.....from J.Piltz

It would be some time ago that I was given to understand that D.Herzog, W.Rausch, and O.Ferrari had gone to the railway bridge over the R.Mojotoro by walking about 3 km along the river, where they found *P.aureispina* growing on a steep rock cliff, very difficult of access.

.....from F.Kasinger

In March 1995 I was also at the location of *Parodia aureispina* in Marsoner's picture. This place is a big vertical cliff about 20m high and 35m long. The *Parodia* were only growing on the upper parts of this cliff. The railway running north from Salta city approaches the Rio Mojotoro along the valley of a smaller river which flows at right angles into the R.Mojotoro. The railway has to cross the valley of the R.Mojotoro by a bridge and then enters a cutting. The Mojotoro river valley itself is about 150m wide here but at low water the river is only about 15m wide. In 1986 it was possible to drive my vehicle down the Rio Mojotoro valley, going through the meanderings of the river here and there. But in 1995 the water was too high, so I had to drive down the smaller valley, crossing through the water and over the railway line in places. At the railway bridge I took photographs from both the west and north sides. The Marsoner picture was taken from the north side, above the Mojotoro river valley with the river between the photographer and the rock face. I will show your slide copy of Marsoner's picture to the *Parodia* meeting in Weisbaden this year.

.....from J.Lambert

Having considered this account and taken a good look at the sketch of the supposed site of where Marsoner found his *P.aureispina*, I have to say that I do not find it convincing. When the Rio Mojotoro is running at low water, there are problems in driving along the exposed river bed, because it consists of quite coarse pebbles. Lorries do get down to collect some of this material but I can not see an ordinary saloon car getting down as far as the railway bridge. My own approach to this site was down the valley of the Rio Mojotoro. I got as far as about 500 metres upstream from the railway bridge and then had to proceed on foot, until I reached the small tributary coming from Salta city. There I found a ford to cross the water, climbed the embankment, crossed the railway line, and found myself at the foot of the (artificial) cliff where the *Parodia* grew. By climbing up the lower part of the cliff, with much difficulty, I succeeded in collecting four very small plants; the bigger specimens grew higher up and they were definitely out of reach. One of these plants has now flowered in my greenhouse (JL 380) and these plants belong to the form of *P.aureispina* described by Weskamp as "var. *mojotorensis*". Now a variety and the typical form of a species are never sympatric, but must be separated from each other in some way. Hence it is absolutely excluded that the typical form should grow "right round the corner" so to speak, from its variety.

.....and later

Recently I had a most enlightening discussion with K.Beckert who has also been to the Mojotoro railway bridge. It so happens that he approached the site in exactly the same way as I did, crossing the ford of the small tributary and climbing the embankment up to the railroad. But then, instead of searching the western facing cliff in front of him, he turned round the corner from the tributary valley into the Rio Mojotoro valley. There, on the north-facing slope, he found darker-spined specimens of *Parodia* just like those we know among older plants in cultivation.

Hence it is not correct to propose, as Weskamp did, a variety *mojotorensis*, as both forms are indeed sympatric, so that we may consider them as phenotypes, of which the differences are due to environmental factors. In this case it is most likely due to the difference in lighting, as the plants on the north-facing slope will receive considerably more and stronger sunlight than the plants on the west facing cliff. The result being darker spined specimens on the one cliff and paler spined specimens on the other.

In addition, the main argument on which Weskamp justifies his variety *mojotorensis* i.e. that the typical form of *P.aureispina* has 40 radial spines, against 20 in the paler spined plants, is not correct. Backeberg also mentions 40 to 50 radial spines but we may see clearly on his photographs that the actual number is markedly less! If Weskamp has merely repeated this spine count from Backeberg's description, then it suggests he has never taken the trouble to count the spines on a live specimen!

Indeed I have myself counted 20 to 25 radial spines on "classical" cultivated plants of *P.aureispina*. When Blossfeld writes in 1936 that "next to the nice rarity with the golden spines" there are degenerate or hybrid forms to be found with paler yellow spines, it simply shows that he did not understand the variability of the species. In addition, this all throws an interesting light on why Backeberg described the plants under the name of *P.mutabilis*, meaning variable!, which must now be regarded as a synonym of *P.aureispina*.

.....from K.Beckert, *Inter Parodia Kette* 6.1996.

The long railway bridge crosses the Rio Mojotoro and then runs south alongside a tributary. If this location is visited in the months of October or November, the river carries little water and it is quite possible to drive along it with the truck to this railway bridge. Right beside the end of this bridge is the rock which forms an obtuse angle at this spot, the two sides of which differ in their appearance. The face parallel to the railway line is stepped and heavily overgrown with bushes and to some extent with small trees. The side of the rock facing the river is quite steep, up which one could clamber with the necessary skill. But there is no way that mountaineering equipment is required, because of the wasps. Further along, the cliff is less steep, but runs straight down to the river bed, so that it cannot be negotiated from below. This part of the cliff is also patchily overgrown and stepped.

The *Parodia aureispina* grow on both flanks of the cliff, colonising the bare rock on ledges and clefts, singly or in groups. The larger plants are on the upper third of the cliff, unreachable from below, with smaller

ones further down. On the tributary side, they grow on ledges under the bushes. On a visit to Cafayate, D.Herzog told me that *P.aureispina* extends further southwards, with a transition to *P.mutabilis*.

It is conspicuous that the plants here display real variation in habit. The form with the paler central spines, as represented by FR 922, grows more under bushes on the tributary side of the rock and also displays fewer radial spines, whilst the form in full sun on the cliff face displays 4 to 6 strong golden yellow to brown central spines and a basically larger number of radial spines. These number about 35 so that the number of radial spines has some shading function. Unfortunately Backeberg in the original description has omitted the variability of the spine colour and number.

.....from J.Brickwood

The photographs in the I.P.K. Journal of the type population show a smooth grey rock face inclined upwards at about 60° to 70°, which appears to display a system of more or less horizontal and vertical joints, with the dip of the strata effectively determining the slope angle of the rock face. They certainly look as though they would be treacherous to a non-climber. Beckert is clearly convinced that he was at the rock face in Marsoner's picture. The *Parodia* grow squeezed in crevices, with bromeliads and a few small shrubby plants. In one of the pictures of this rock face I can just about make out what looks like a short columnar cactus, perhaps 25 cm long and 2-3 cm in diameter, as well as something that might be a *Jatropha*.

....from H.Middleditch

In the 1936 Blossfeld account it is observed that the finest form of the golden spined *Parodia* grows only on one rock wall and the task they faced was to "ascend the sun-drenched northern wall". It appears that the



Beim Sammeln von *Par. aureispina* in Salta. Verf. bei + am Seile hängend. Phot. O. Marsoner

Collecting *P.aureispina* in Salta.
Blossfeld at "+"
Photo - O.Marsoner
Kakteenkunde - March 1936

site of this find has now been established, next to Mojotoro railway bridge.

.....from P.Down

In my own collection I have quite a few plants under the name of either *P.aureispina* or *P.mutabilis*. My own plants of *P.aureispina* are all golden yellow spined, the spines turning horn colour near the base of the plant. The spines are similar on *P.aureihamata*, which is just another name for *P.aureispina*. But having said that, in 1995 I did find a tray of seedling *P.aureispina* containing a single plant with almost black centrals. My plants of *P.mutabilis* display central spines which can range from reddish to orange-brown. A plant of *P.mutabilis v.carneospina* has light brown to pink coloured central spines, and *P.mutabilis v.ferruginea* has rust-brown centrals. In regard to the flowers, all have blooms in shades of pale yellow to orange. Some plants have a reddish throat to the flower and the shape of the petals is not constant throughout. In continental nurseries I have seen large beds of *P.mutabilis* in which there was a considerable range of spine and flower colour - even a few red flowers among them! One or two of my *P.mutabilis* have a darker grey-blue body as opposed to a glossy grass-green body

.....from P.Leigh

It will be quite some time ago, possibly in the 1970's, that I obtained an imported plant of *P.aureispina* from Whitestones. For years it has grown steadily and put out offsets so that eventually it formed a fairly large clump. Unfortunately it became afflicted with an infestation of mealy bug which was so serious that I was eventually obliged to break up the plant.

.....from H.Middleditch

Being most fortunate in acquiring one of the foregoing offsets, I am now able to see that the spines on this plant really are yellow; only the tips of the central spines which stand right over the growing point have a darker tinge.

.....from W.Verheulpen

Both *P.mutabilis* and *aureispina* are very similar; I find that the new spines at the crown are darkish coloured in *aureispina* but quickly become yellow as they grow outwards, whereas they remain dark on *mutabilis*.

.....from J.Brickwood

I have had several *P.mutabilis* over the years - I cannot seem to keep them going for long! - with central

spines ranging from golden-yellow, bright yellow, light brown, rusty brown, to reddish. However, they all had approximately the same spine count and configuration, with flowers notably larger than *P.aureispina*, often with reddish filaments - a colour that I have never observed in *P.aureispina*.

.....from H.Middleditch

Bearing in mind that *P.betaniana* originates from this same general area in which *P.setifera* is found, does this sort also exhibit the feature of tuberculated ribs?

.....from G.Charles

Among my seedlings I do have a tray of *P.betaniana* DH 209. You have to look at them quite closely in order to see that they do have what amounts to ribs, which lie on a spiral. Some of the spirals are left hand, some right hand - there are roughly about half of each sort. The ribs are divided into tubercles but the cross-furrows do not go right to the base of the rib. They certainly seem to differ in this way from most of the *P.microsperma* group.

.....from F.Kasinger

You may be interested in seeing the enclosed slide of *P.setifera* which were photographed near Lumbreras. Here we climbed a gentle slope carrying many small trees, the ground looking like red loam. At this location plants were seen up to 12 cm in height and 6-7 cm in diameter.

.....from H.Middleditch

The two plants in this picture (on the front cover) are growing side by side, their height being roughly three times their body diameter. The ribs effectively lie vertically up and down the body of both plants, although they do wander very slightly sideways, left and right away from the straight, at places over their length.

.....from J.Lambert

An excursion from Salta took us to Lumbreras, where we had to climb a hill covered with dense bushes, with a carpet of spiny Bromeliads in between. An unpleasant experience indeed, all the more so as the place is teeming with ticks! But then comes our reward; as the upper part of the hill becomes steeper and less bushy, we discover a fine population of *P.setifera* in flower. Although Parodias can be satisfied with a small amount of humiferous material on which to take root on otherwise bare rock, we even found here one specimen growing in the fork of a tree! The slide from F.Kasinger taken near Lumbreras shows a not very typical plant, apparently one that is both old and elongated.

.....from F.Kasinger

We also found similar plants of *P.setifera* about 5 km from San Pedro, which lies about 65 km from Jujuy down the valley of the Rio Grande. They were growing on quite a steep slope with many trees, in fact it was almost like a forest. Here the plants were essentially smaller in both height and diameter compared with those we saw near Lumbreras, being about 3-5 cm tall and 2-3 cm in diameter. The *Parodia setifera* that have been in cultivation in my own greenhouse for nine years do not seem to have put on any growth in height worth mentioning.

.....from J.Brickwood

It is most interesting to see how tall *P.setifera* grows in habitat - I do not think that such a cylindrical habit has been mentioned in the literature for this species before now, but that may be only because no one has grown them long enough in cultivation to reach that size. However, I do not think that a cylindrical growth is unique to this species - I strongly suspect that most *Parodia* will elongate with age if grown for long enough. In any event, the plants photographed by F.Kasinger seem to match those presently in cultivation reported from the Lumbreras area. My own examples of *Parodia* sp. P.239 from San Pedro (Jujuy) give every impression of being only a local variant of *P.setifera*, as does *P.cabracorralensis*.

.....from H.Middleditch

It now appears to be possible to state that plants of *Parodia setifera* may be found growing not far from Mojotoro, as well as further to the east near Lumbreras, and more to the north near San Pedro, as well as a similar form near Cabra Corral. If these locations are plotted on a map it would suggest that *P. setifera* may well be found at further places between these known locations. As observed (above) by F.Vandenbroeck, finding any such habitat location would appear to be very much a matter of chance. These *P.setifera* may be distinguished from the majority of the small-seeded *Parodias* by their tendency to produce distinct ribs, although other *Parodia* found in the adjacent area to the south-east may also display a similar feature. [Several of the place names referred to above may be found on the Chileans' map of Central Salta]

CACTI AROUND FILADELFIA By F.Vandenbroeck **Translated by W.W.Atkinson from Succulenta 6.1989**

Filadelfia, a settlement situated in the centre of the Chaco Boreal, or northern Chaco, lies at 450km north of Asuncion, the capital of Paraguay. The Gran Chaco is an immense and extensive lowland area in central south america which stretches in a north-south direction from the Sierra de Chiquitos in south Bolivia to the Sierra Cordoba in Argentina, and in a west-east direction from the foot of the Andes to the drainage areas of the rivers Paraguay-Parana in the east. An area of about a million square kilometres.

Geologically, the Chaco consists of a sort of deep trough between the Andes and the high land of Brazil, which over thousands of years became filled with debris and sediment from both these mountain areas. The result was an immense plain traversed by several sluggish rivers and with vegetation which varies mostly in a north-south direction. Two rivers from the Andes, the R.Pilcomayo and the R.Bermejo, divide the Gran Chaco and partition the area into three varied landscape zones: the Chaco Boreal in the north, the Chaco Central

between the Pilcomayo and the Bermejo rivers, and the Chaco Austral in the south. The south and central Chaco (Argentinian territory) had already been opened up and colonised in the last century, whilst the northern Chaco, which lies almost wholly in Paraguay, remained a mystery to Europeans and was regarded as dangerous, because of its difficulty of access. Only at the beginning of this century was it colonised. Even now, the Chaco Boreal, with an area of some 3000,000 square kilometres, is populated only by small and isolated indian settlements. Here we are concerned only with the northern Chaco and specifically with the area around Filadelfia.

The Chaco Boreal is a completely flat region originally with an enclosed vegetation which varies from northwest to southeast in accordance with the change in precipitation. There is a steady diminution of rainfall across the Paraguayan Chaco from east to west. The wet part of the Chaco Boreal, near the river Paraguay, consists in great part of the so-called "Varzea" areas, occasionally or permanently flooded swamplands which exist under the influence of the Rio Paraguay and its tributaries. These flooded savannas reach a width of 200 km in the southeast of the Chaco, due to the extremely small gradient of the watercourses and the almost impervious subsoil. The region is almost uninhabitable, and the few buildings that are to be found there are usually built on piles. The area has a rich vegetation of marsh- and water-plants and is distinguished principally by extensive stands of palms (*Copernicia* sp.). Birdlife is very rich and diverse; many sorts of storks, herons, spoonbills, ducks, parrots, birds of prey, and so on, occur in abundance. Even from the Transchaco highway this birdworld is in full view.

As soon as one gets out of the area of influence of the Rio Paraguay region in a north-western direction, one comes more and more into dense stands of thorny bushes and the soon the first cacti appear. Especially evident are the great columnar cacti and the so-called bottle trees (*Chorisia* sp.) with their typical xeromorphic structure. In the far northwest the thorny bushes tail out somewhat to make way for sandy areas. It is now possible to travel quite extensively in the Chaco Boreal during the dry season, principally because of the improvement of the road network and the effects of government policy towards more intensive colonisation. However, this opening up has great negative aspects: many interesting natural biotypes are threatened or already destroyed by the introduction of agriculture. One does not easily forget a stay in the Chaco; the empty, monotonous and (especially in sombre weather) melancholy, endlessness makes a deep impression on one's mind.

The area around Filadelfia is fairly unique, both botanically and in terms of human activity. The Mennonites found here a nature that was new and unknown to them; a more or less impenetrable thornbush ground cover, mixed with large numbers of frightful-looking cacti and bromeliads. In addition to the impenetrable brushwood they found some open sandy areas, thinly populated with grasses as well as occasional trees. These lands were called "Bittergraskamp" (fields of bitter tasting grass) and have their origin, geologically speaking, in filled-in abandoned river beds. It is on these somewhat exceptional lands that the settlements were started. The dense bush vegetation, on the other hand, grew on a more limey ground, and was later increasingly brought into cultivation.

In the area of the colony of Ferheim there were originally many cacti. Not a great many species, but certainly a great many plants. This quantity was substantially reduced by increasing cutting and cultivation. With the exception of only one species, all the cacti grew amongst the thornbush vegetation. This vegetation is extremely dense and spiny; one stands before a wall of viciously spiky branches and twigs, and the ground is covered in many places with carpets of sharply armoured bromeliads and creeping cactus species. The most eye-catching cacti are two cerioids which protrude above the surrounding vegetation; *Stetsonia coryne* and *Cereus forbesii*. *Stetsonia coryne* is a typical Chaco- or lowland- cactus. It is numbered in thousands, spread throughout the dry parts of the Gran Chaco. It is tree-like with a short trunk and grows to 8m tall. They are night flowering with large white flowers and a long narrow tube. Less frequent is *Cereus forbesii*. This plant stays somewhat smaller, and branches less readily. The stems have only a few un-notched ribs, and exhibit constrictions which give an indication of the seasonal growth of the plant.

Another large, though not conspicuous and not very abundant cactus is *Quiabentia pflanzii* (syn. *Q. verticillata*). It is a plant from the *Opuntioideae* group and is not very obvious amongst the dense thornbush vegetation because of the fact that it becomes bushy itself with cylindrical branches and fleshy leaves which fall off in the dry season. The Chaco around Filadelfia has a few larger growing *Platyopuntias* such as *O. chakensis* and *O. pyrrantha*. The Mennonites call these plants "Schlorrekaktus" (slipper cactus) because the pads resemble the sole of a slipper.

Typical for the dense thornbush of the northern Chaco are several cactus species which exhibit a creeping growth and often form large groups of extended chains. Amongst other hazards, these plants, in association with some frightfully spiky bromeliads, make a journey through an area of bush a perilous undertaking. One of them is *Opuntia retrorsa*, a *Platyopuntia* with uncommonly long, narrow, joints which grow entirely procumbent in chains of many metres in length. *Eriocereus* sp. grows into large tangled masses in which, in course of time, most of the branches become prostrate. We find also *Cleistocactus chacoanus* and *Monvillea chacoana*, columnar cacti with long snake-like branches which wind about amongst the bushes or lie on the ground. A tiresome plant is *Opuntia aurantiaca*, a sodshaped cactus from which by the slightest contact the joints break off and attach themselves to skin, clothes, or footwear. *Monvillea spegazzinii* is a pretty, blue veined, black spined, columnar cactus which snakes its way through the bush. It is rare here, and according to G.Esser is at the western limit of its habitat.

Much rarer in the Chaco bush, though with luck to be found in numerous specimens, is a small, curious globular cactus with only about eight sharp ribs, and sparsely spined. The brown-grey colour of the body is an excellent camouflage which enables the plant to merge with its reddish-brown alkaline soil surroundings, withered leaves and branches, and in general is not at all conspicuous. Once such a plant has been spotted,

more of them are usually to be found in the vicinity. They are described under the name *Gymnocalycium mihanovichii* v. *filadelfiense* Bckbg (syn. *G. chlorostictum* nom. prov.). The plants seem to form small local colonies and have only a limited spread. They grow only in dense thornbush which is scarcely - or not at all - liable to be eaten by cattle, and therefore seemingly have a dependence on a special microclimate determined by the dense surrounding vegetation. The plants are not to be found in the areas that have been cut down or are regularly grazed. Only the larger columnar cacti seem to be able to survive the thinning out of the thornbush (on this, see also G. Esser, *Vegetationsgliederung und Kakteenvegetation van Paraguay* p.83). The continued existence of this plant in the area is under threat due to the intensive agricultural activity round the Mennonite colony. On the other hand, the plants get a chance of survival on account of the windbreaks; these are strips of bush which are left in place to grow naturally and offer some defence against wind erosion.

As a companion plant to these small *Gymnocalycium*s, one sometimes finds a grass-green globular cactus with a tendency to columnar habit which is described under the name *Echinopsis rhodotricha* (syn. *Echinopsis chacoana*). Although credited in the literature with attaining a height of more than 50 cm., we found no plants around Filadelfia taller than 20 cm.

In the same region appears another representative of the genus *Gymnocalycium*, though growing in a totally different biotype. The Mennonites call it "Der Kaktus vom Bittergraskamp". We have written earlier of these sandy open plains with bitter tasting grass. It is not easy for an outsider to appreciate the nature of the original plains. Especially as they are becoming rare due to the original grassland being more and more ploughed up and seeded with "Buffalo grass" which is of more use to cattle. One of the Mennonites took us to where he thought this cactus was still to be found. On a sandy terrain grew scattered clumps of tough grass. After some effort we did indeed find here and there a few examples of a large flat globular cactus. Various names might be applied to this plant: *Gymnocalycium tudae*, *megatae*, or *onychacanthum*. Most of them have typical greeny-brown colour, though there were a few examples with a fresh green appearance. They grow mostly at the foot of clump of grass. Some plants form large groups over time. They are not easy to see because of their camouflaging colour and can be deceptive; painful consequences can follow when man or beast happens to tread on them.

Spread around the grassland are occasional trees, under which is to be found the beautiful yellow flowering *Tecoma argentea* or *paratodo*, the *quebracho colorado* (*Schinopsis lorentzii*) and the blue flowering *jacaranda*, all together lending to the landscape the character of a savanna.

.....from L. Bercht

The idea that the areas of thornbush in the Chaco grow on an alkaline soil, and also that *G. mihanovichii* thrives on an alkaline soil, rather surprises me. In my own collection I have both *Notocacti* and varieties of *G. mihanovichii* growing side by side, in precisely the same compost, and both seem to thrive equally well.

.....from K. Billet

I do have some plants from the *Muscosemineae* group, but these plants are very difficult to grow in cultivation. In the main nobody here seems to have found out how to handle these plants. In collections in Czechoslovakia where plants of this group were grown, I saw several times that they were in very flat and very large pans or trays - not in pots! And the plants grown in this way looked very well! Also these plants need rather more warmth in the wintertime. The soil in their habitat I believe to be a little more alkaline than acid, perhaps only in the deeper parts of the soil. Whilst the uppermost centimetre of soil could be more acid. So these plants grow in a very hard soil like the "terra rosa" in south Europe, so that they have only horizontal roots which search for water and food in a very thin layer of leafy soil. Perhaps this is why we all have big problems with these plants.

.....from J. Lambert

I did not make any note about the root system of the *G. mihanovichii* which I found whilst crossing the Chaco in province Formosa, so it probably did not strike me at the time as being in any way unusual. However, the soil there consists of a mixture of sand and clay, which becomes as slippery as soap when wet! This kind of soil retains quite a bit of water when it is raining, so that *G. mihanovichii* occasionally stands quite literally in water. Under such circumstances one would not expect plants to develop a deep rooting system.

.....from H. Middleditch

It is observed by F. Vandebroek that *Gymnocalycium mihanovichii* and *Echinopsis rhodotricha* may commonly be seen growing together. In *Ethnobotanica Lengua-Maskey* 1981, P. Arenas presents a review of the natural vegetation in an area occupied by Lengua indians, centred on Mision Nueva Vida. It is effectively a comprehensive appreciation of how the native population regarded the natural vegetation and its uses. It is noted that the native name for *E. rhodotricha* is "mat nawa" whilst the native name for *Gymnocalycium mihanovichii* is stated to be "yam mat nawa", this latter being quoted in Spanish as "semejante a mat nawa" i.e. resembling or similar to *E. rhodotricha*. Since these two sorts do not resemble each other, it may perhaps be surmised that the native indians regarded the two sorts as growing in similar places, or having an affinity for similar growing conditions.

A VISIT TO PARAGUAY From D. Metzger

We paid a visit to Paraguay in July and August of 1988. This is the winter time when it is drier and colder than in summer. The shrubs utilise different strategies to contend with the aridity of this season. Some drop their leaves whilst other sorts have small and/or hard succulent leaves. In July the shrubs of *Capparis* and *Maytenus* still had leaves and normally they tend to grow fairly close together so that a more or less dense forest of shrubs is formed, with some trees among them such as *Aspidosperma* and *Schinopsis*, for example.

The ground in between the shrubs is very often covered with dry leaves, etc. as you can see in the photographs. But the photograph of *Gymnocalycium* M.19 was taken in an untypical area, near a settlement, so the vegetation has been thinned out by woodcutting and the effects of cattle grazing. In the picture there is very little intact natural vegetation. When the vegetation is disturbed, the erosion of the loamy soil begins. The rainfalls are irregular but sometimes very heavy. As a consequence the solitary bush with its accompanying *Gymnocalycium* is now on a small pedestal of earth. When the wet loam dries out there may be cracks appear in the ground, such as those which you can just see in the photograph. At this same location we found more *Gymnos* of the same species under shrubs. In the surroundings grow *Stetsonia*, *Quiabentia*, and *Echinopsis*.

The conditions are generally similar at the growing place of *Gymnocalycium friedrichii* M.24, but the climate is more arid there. We found only a few *Tillandsias* on the trees there, but *Bromelia serra* or *B.hieronymi* are common. Other cacti at this location are *Stetsonia*, *Cleistocactus*, and *Monvillea*. It is not so difficult to distinguish between *G.mihanovichii* and *G.friedrichii*. The epidermis of the latter is more rough and dull, and the ribs are sharper.

As I knew *Geurypleurum* from plants in cultivation at home in Germany, it was very easy to identify when we came across it. There are almost no differences between the plants in nature and those in cultivation. The photographs of *Geurypleurum* M.20 were taken in the dappled shadow of the forest, or quebrachal. You need quite a bit of luck in order to find these particular *Gymnos*. Several times we struggled in among the dense and thorny shrubs without finding a small cactus. Once we found *Geurypleurum* after we received some information from a military officer; on another occasion we saw a large specimen close to the roadside whilst we were driving along in the jeep. In 1990 I had fruits on *Geurypleurum*, but not this year. It clearly belongs to the *Muscosemineum* group and is closely related to *G.damsii*. Despite a certain degree of superficial similarity in general appearance, it has nothing to do with *G.pflanzii* which also grows in the north west of Paraguay, in a more open type of vegetation.

....from J.Arnold

It is the first time that I have seen the photographs of *Gymnocalycium* taken by D.Metzing in Paraguay. I feel quite certain that the photos of *Geurypleurum* show precisely the same plant that I am growing under this name, even given that I am comparing a plant at rest in cultivation with a plant in habitat that is growing. Also I am reasonably sure that it matches Ritter's description and photograph of this species well. It is distinctive in having broad flat ribs and the appearance I feel is very like *G.chiquitanum* and some forms of *G.damsii*. The colour of the body is also like that of *G.chiquitanum* - a sort of bronzy green. I would accept that it shows some similarities with *G.pflanzii*, although I feel that the body texture and colour are very different. The *pflanzii* group *Gymnos* tend to have a velvety texture and a matt green or grey-green colour, whereas *Geurypleurum* has a glossy body of smooth texture, like *G.damsii*, of a bronzy red-green or yellow-green colour. In addition I suspect that the spines on *Geurypleurum* are thicker than those on plants of the *pflanzii* group. The flowers which I have seen on a plant grown by R.Gooch are outwardly like those of *G.damsii*.

....from M.Muse

My own plant of *Geurypleurum* FR 1178 is now of flowering size and produces blooms on and off from May through to September. On an occasion in May when it was extremely hot, the flower opened fully so that the petals were reflexed and I was able to see right into the flower, so I attempted to pollinate it with a view to setting fruit, using pollen from *G.damsii*. On this and other occasions the persistent use of the pollinating brush has all been without result. Following a suggestion from F.Fuschillo I even pulled out tufts of anthers from *G.damsii* and pushed them into the flower again without result. The appearance of this flower bears scant resemblance to those of *damsii*, *mihanovichii* and *hamatum* and seems to be closer to the flowers which I have seen on *G.pflanzii*.

.....from H.Middleditch

My impression of the flowers on the *Muscosemineae* group of *Gymnos* is that they have an elongate appearance with a relatively long tube and a more or less funneliform corolla. The tube is slender in *mihanovichii*, *damsii*, etc., and somewhat stouter in *schickendantzii*. The flowers do exhibit a slight urn-shape but this does not appear to be very marked. The photograph taken by M.Muse of the flower of *Geurypleurum*, by contrast, has a very distinctive urn shape. Below the urn-shape broadening there is a fairly short cylindrical section of tube (But not as short as on *G.pflanzii*). The outermost petals are greenish-brown; these go over into the outer full length petals which are white with a pinky-brown midstripe that is darker and broader at the tip, becoming a faint pink midstripe on the inner petals; the innermost petals white. From the section of the flower it may be seen that inner wall of the tube lacks any pink colour and the tube is very thick walled in proportion to the size of the flower. At the top of the cylindrical section of the tube there is inserted a ring of stamens which lean slightly towards the style; these filaments are straight. There is then a gap of about two or three mm free of stamens, above which are a mass of filaments which arise almost vertically from the inner wall of the tube and curve over inwards; anthers white. The style is relatively thick, the stigma lobes are half-open. When the flower petals are fully reflexed, the stigma is clearly visible (about half way up the body of anthers) and this again is a feature which I do not associate with flowers on *Muscosemineae* *Gymnos*,

.....from M.Muse

After all my unsuccessful attempts to persuade my *Geurypleurum* to set fruit by use of a brush, pollination has occurred without any help from me and my guess is that either *G. friedrichii* or *G.spegazzinii* were the agencies involved. This fruit was almost spherical, about 7 mm in diameter, green at first, becoming a matt translucent mid rose pink with only one or two scales, then darkening to a deep opaque rose-pink with the scales becoming more obvious. In December the fruit split vertically revealing a wall of ca. 1.5 mm thick which is a solid dirty rose-pink colour and the fairly large, almost spherical, buff-coloured seeds are embedded in a raspberry-pink substrate which resolves into threads under a hand lens.

Gymnocalycium mihanovichii var. *fiadelfiense* n. inval. M 19

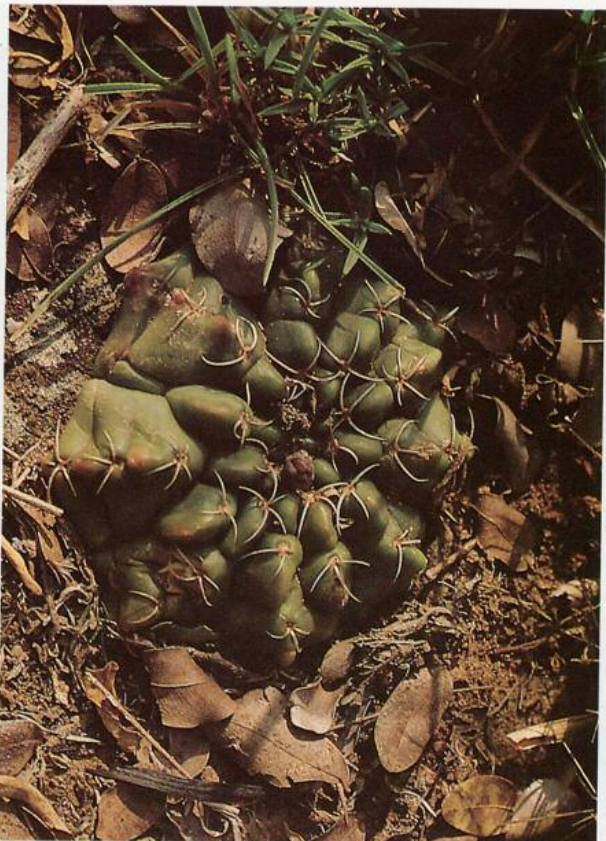


Gymnocalycium erythronum, like *Gymnocalycium* and *Gymnocalycium* are mostly abundant in the lowlands of the Chaco forest. In winter, in the dry season with lower temperatures, the plant has few leaves without flowers and so the sun can reach the ground where the *Gymnocalycium* are growing. In summer when there is a greater rainfall, the shrubs and trees are leafy. The sun at ground level are the most abundant in warm and hot summers.

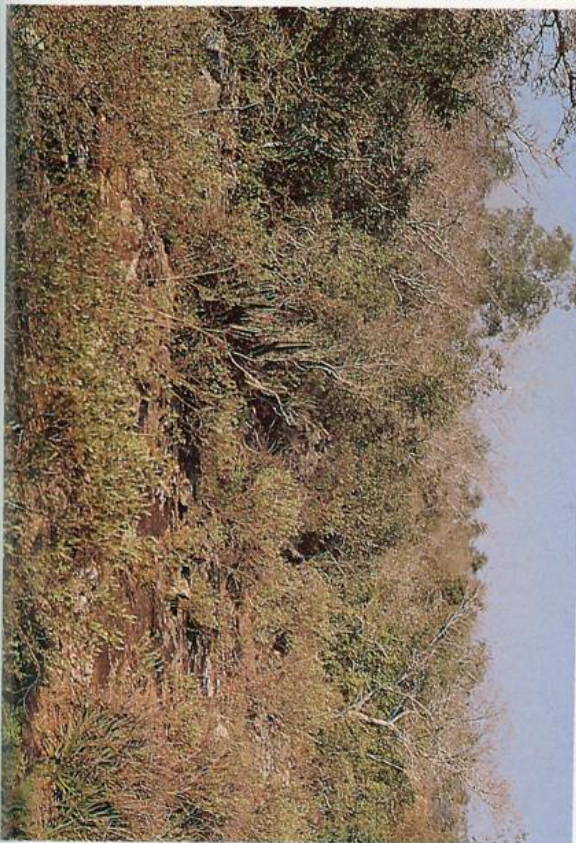
Gymnocalycium friedrichii var. *moserianum* M 24



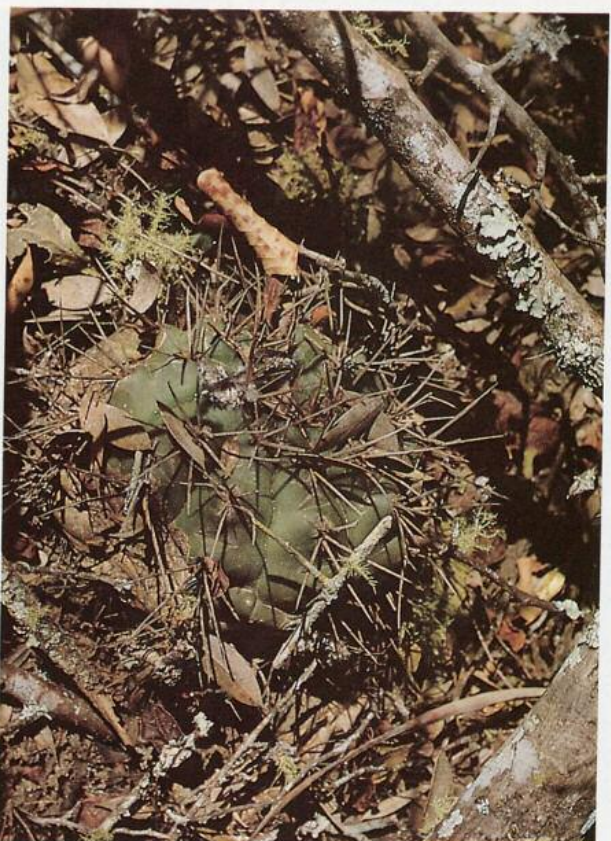
Gymnocalycium paraguayense M 35



Standort von *Gymnocalycium paraguayense*



Gymnocalycium euryleurum, Alterform M 20



Gymnocalycium euryleurum, Jugendform M 20



.....from R.Gooch

The five or six plants which I have of *Geuryleurum* were grown from seed obtained from de Herdt, about six years ago. Despite having had several plants in flower at identical times and repeatedly tried to set fruit, last year was the first success I have had. The fruit ripened during the month of August to a deep pinky-red colour and shortly afterwards it burst open vertically at one side, from which exuded a pulp of similar colour to the fruit, in which the seeds were contained. This year I have set fruit on three of these plants (one had two fruits) although I have still not worked out what are the circumstances which lead to fruit being set.

.....from D.Metzing

The fruit of many plants within this group have the seeds embedded in a pulp. In *G.schickendantzii* I have seen fruits with a whitish pulp. In *G.friedrichii* (= *G.stenopleurum*), *G.matoense*, and *Geuryleurum*, the fruit pulp is red.

.....from R.Gooch

Not only does my *Geuryleurum* have seeds contained in a pulp of similar colour to the fruit, this is also my experience with fruit and pulp of *G.damsii* and varieties, and on *G.friedrichii v.moserianum*, again pink.

.....from F.Fuschillo

A fruit which set on my *G.griseopallidum* did eventually split, with one vertical opening, to expose the red pulp inside. Some of this pulp, together with seeds embedded within it, squeezed out of the split.

.....from S.Ratcliffe

My plants of *G.pseudo-malacocarpus* and *G. griseopallidum* put out buds in October. Fortunately one flower on each plant did open at the same time which meant that I was able to cross pollinate them. This did result in one fruit being set on *G.pseudo-malacocarpus*. By the following mid-summer the fruit had enlarged until it was almost 20 mm long and somewhat less in diameter. It did not split, but was easily detached from the plant. The interior was filled with a juicy red pulp in which the seeds were embedded.

.....from W.Clarke

My *Gymnocalycium* of the *Muscosemineae* group are all in the most inaccessible corners of the greenhouse where they grow well and flower and fruit profusely.

.....from H.Middleditch

Perhaps they get a fair degree of shade in such situations? My own small seedling of *Geuryleurum* had been a brownish-green colour for most of early summer but when the weather finally turned bright and sunny, this plant turned reddish brown in a day or two. So I hid it between several large pots, out of the direct sunlight and after a few weeks it was green again, with a tinge of brown.

.....from D.Metzing

Gymnocalycium euryleurum, like *G.mihanovichii* and *G.friedrichii*, are closely adapted to the special conditions of the Chaco forest. In winter, in the dry season with lower temperatures, the great part of the shrubs are without leaves and so the sun can reach the ground where the *Gymnocalycium* are growing. But in summer, when there is a greater rainfall, the shrubs and trees are leafy. The cacti at ground level are then growing in a shady and warm moist atmosphere.

GYMNOCALYCIUM EURYLEURUM F.Ritter ex Plesnik sp.nov. By F.Plesnik

Translated by G.R.Allcock from Kaktusy 1972

When among other things the firm H.Winter in the year 1964 offered also seeds of *Gymnocalycium*, I was unable to resist and I ordered all of them. Among them in particular was *Gymnocalycium euryleurum* FR 1178, with the observation that it would hardly be possible to offer it ever again, in view of the hazardous finding place in the territory of the savage Moro Indians. I was fortunate, and from 200 seeds there germinated a number of seedlings, from which I supplied some of our members. When two four-year-old plants flowered for me and yielded seeds, I was overjoyed that this rarity was now safe with us.

Since as yet there has not been lodged a valid description, I will now provide one, and for this purpose I describe a cultivated plant of five years of age.

[From the Latin] Stem subglobose, simple, up to 7 cm diameter, somewhat shiny. Ribs 8, straight, continuous, low and obtuse, with a shallow transverse groove between the areoles, bordered by two small triangular patches. Areoles 15-20 mm apart, oval, at first rather tomentose, the felt yellowish white becoming grey, and eventually dropping off. Radial spines 5-6, one being directed downwards, central spines either one or missing. All spines acicular, 25-30 mm long and slightly recurved, at first brownish yellow, later becoming grey with a brown tip. Flower 45-50 mm in diameter, the pericarp and tube furnished with paler scales, white margined and marked with a red blotch at the tips. The inner petals lanceolate, rose-violet, sometimes with a pale rose central stripe and a dark tip. The filaments white and the anthers pale yellow, the style white and the 12 stigma lobes yellowish-white. The fruit globose, 20 mm diameter, scarlet and with scales, the pulp scarlet. The seeds brown, 0.5 mm in diameter, corresponding to the subgenus *Muscosemineae* Schutz.

Country of origin: Western Paraguay, in the territory of the Moro people. It refers to the seed designated FR 1178 Friedrich Ritter. Holotype in the Plesnik collection No.763

[From the Czech] The body colour is green, a little glossy, not offsetting, body diameter 7 cm, with 8 ribs, these being continuous, straight, very low, rounded and wide. The areoles are 1.5 to 2 cm apart, elliptical with scanty yellowish-white felt, which goes grey and later falls off entirely. Between adjacent areoles of the same rib is a sharp, shallow groove, producing two opposed triangular facets. There are 5 or 6 radial spines, of which one is directed downwards, the others sideways in pairs, centrals 0-1. All are acicular and slightly curved, 2.5 to 3 cm long. On emergence the spines are brown, later horn-coloured with a dark brown tip, and

projecting.

The buds are green, the scales on them greenish with a carmine tinged tip; grading into the outer petals, which are faintly violet with a somewhat darker violet midstripe, brown tinted at the tip, and lanceolate. The floral tube is about 1 cm long, of a light green colour, the scales lighter with a yet lighter border and a carmine red tip. The inner petals are faintly violet rose, sometimes with a faintly rosy mid-stripe and a darker tip, and lanceolate. In all there are two series of inner petals. The flower has a diameter of 4.5 to 5 cm, white filaments, creamy anthers, the stamens very densely packed and inclined towards the stigma, which however they do not conceal. The style is white and the stigma creamy-white with 12 lobes. The fruit is globular, of about 2 cm diameter, carmine and with scales of that colour, the flesh carmine, the seeds brown, 0.5 mm in diameter, in appearance answering to the subgenus *Muscosemineae* Schutz.

.....from G.R.Allcock

The name of this species is derived from two Greek words, one meaning broad, the other referring to rib, hence *eurypleurum* equals broad-ribbed.

.....from H.Middleditch

In this description of *G.eurypleurum* the Holotype is stated to be in the Plesnik collection. Presumably it would be a living plant and as such is not likely to be acceptable as a Type. Hence it appears that this description may not be valid and in that event the description of this species by F.Ritter in *Kakteen in Südamerika* 1979, will presumably be the valid description of this name. Ritter tells us that the Type location for FR 1178 was at the foot of the Cerro Leon in north-west Paraguay.

.....from D.Metzing, at the 1993 Chileans Weekend.

No Type specimen was conserved for the species name of *eurypleurum* which was described by Plesnik in 1972, so it is the Ritter name which is valid. In the course of our visit to Paraguay we drove north from Filadelfia, needing to travel well over 100 km into north-west Paraguay to get near Cerro Leon. The earth track we had to follow was only wide enough for one vehicle, hemmed in at either side by the Chaco bush, running dead straight for kilometre after kilometre, with no sign of any habitation or livestock. The last inhabited place we called at was a small military post and many km still further on, we were finally able to see the Cerro Leon. But the track was deteriorating, our provisions were running low and not many hours of daylight were left so reluctantly we decided to turn round and retrace our steps.

A VISIT TO CERRO LEON By F.Ritter Translated by H.Middleditch from "Forty years' Adventuring"

On the 18 September 1963 I procured a ticket in Asuncion for a bus trip to the Mennonite colony of Filadelfia, 400 km away to the west across the Gran Chaco. The omnibus made a start at 3.00 a.m. and drove through endless stretches of Chaco scrub woodland and through savanna with palm trees. In the afternoon the bus arrived at its destination. The Chaco is as flat as a table. There is only one significant mountain which lies further to the northwest, the Cerro Leon. It had never been searched for cacti, because under normal circumstances it would be impossible without mounting an expedition at considerable expence. This is the territory of the wild Moros indians. But for some years roads have been driven there by a north american oil company who drilled some exploratory wells, and abandoned the area after finding nothing.

Today the wild indians have been pushed well away from the Mennonite colony; the Paraguayan military posts and the agricultural settlements have extended steadily further in the direction of the Cerro Leon. On 19 September a lorry drove up to my lodgings on which there was a sign in large letters "Salesian Mission to the Moros Indians". The vehicle was full of indians, whom the catholic missionary had brought here for an outing. The host at my lodgings gave them a bucket of water with a dipper, which they did not use, but drank out of the bucket like cows, one after the other.

With one of the Mennonites who had got to know well the routes in the territory of the wild Moros at the time of the oil exploration, I had come to an arrangement to convey me to the Cerro Leon in his vehicle, because when the tropical forest once again overgrows the tracks, an exploration there for cacti would again become impossible. At the same time I approached a Finnish journalist who had got to know about the Mennonite colony and also about the Moros indians, and I conversed with him about the indians. He had a fancy to come along with me but it still appeared to him to be a very hazardous enterprise. And so it was. The small pick-up, a Willys, had four wheel drive. After some hours driving we heard a noise like a hard blow. As my travelling companion looked into it, on the back of the radiator was a hole from which the water was escaping. The hole was plugged with a rag and some chopped up leaves of Mate were put into the radiator and soon only the barest trickle of water remained. Water was very scarce on this road.

Before evening a thunderstorm came up from the south. It had been very hot that day and in the afternoon the wind turned round from north to south and lowered the temperature. Those are the weather conditions which can bring rain. On the way there were many wooden bridges. Eight of these had been burnt not long before by the wild indians. Since it has not rained for a considerable time, the bridges could be got round without any difficulty. The rain first set in as the pick-up was beyond the last burnt-out bridge. The Mennonite was worried that if it continued to rain hard we could probably not get back again, but it did not rain any more. The moisture sank only a cm into the bone dry ground. We overnighed in the pick-up.

Early in the morning we set off again, heading always west for a couple of hours. At one spot a bridge was half washed away but the bed of the river was dried up with water only remaining at a deeper place in which a large number of fish were collected together where they continually threshed the surface of the muddy

water. Shortly afterwards a branch road turned off to the north along the west flank of the Cerro Leon. This road had formerly been laid down by the oil company to a watering place, from which my driver had often taken water to the drilling camps. The road had not been driven over for four years and was getting overgrown. Anyone else would really not have known that a road had gone through the scrub here at one time. The bushes were two to three metres high with arm-thick branches. But the driver was bent upon reaching the foot of the Cerro Leon. At walking pace he drove the pick-up through the bushes, rolling over the bushes with the push-bars and the front axle, over an 8 km stretch. There was a risk that the radiator could get knocked again, or else something would get broken or damaged. But all went well, as one would have hoped. Only once did the wheels sink suddenly into two deep potholes which could not be seen on account of the bushes. That gave us a hard thump. One of the connections between the transmission and the chassis had been broken. Despite that, the pick-up remained drivable. Finally at about 1.00 p.m. we came to the waterhole at the end of the track, a fine large hollow at the foot of the mountain with rich vegetation, in addition to grassland and swamp with many large waterfowl. To go from here to the Cerro Leon was not advisable on account of the dense vegetation. Also during the night many midges would be expected close to the water. So we drove a short way back and let the pick-up stand on a stony hillock. It had now become too late to get to the Cerro Leon. So for this day only the nearby surroundings were searched, and a fine new *Gymnocalycium* was found in flower and fruit; published by me as *G. eurypleurum*.

The night passed off well in the pick-up. Early next morning I set off alone towards the mountain. The driver would have willingly gone with me but now he did not risk the danger of leaving the pick-up unattended. If it was to be found by the Moros indians, they would smash it up. From the military post at Teniente Martinez, which we had passed on the way, one or two men were willing to join us for defence, but they had to hunt for meat, so we had to continue on our way on our own. The Mennonite had a shotgun and would go no more than three paces from the pick-up without it. The host at my lodgings at Filadelfia had loaned me a revolver for the journey. With my rucksack and the revolver, I crept through the bushes until I reached the mountain. In Filadelfia I had been told that the mountain was 500 or 600 metres high, but my altimeter showed me not once 100m above the plain. On the next slope I found between quartzite rocks two new *Gymnocalycium* spp., where I recorded the relevant data and collected some fruit. These were published by me as *G. stenopleurum* and *G. paediophyllum*. Fortunately there was no sign of the Moros on the whole trip.

On 23 September we returned to Filadelfia, where it had been feared that we had fallen to the indians. Far and wide in Filadelfia there is only sandy ground without any sign of stone. The driver had brought some stone back with him from the spot where we had stopped the pick-up, as a curiosity. In Filadelfia this was passed from hand to hand and gazed upon with astonishment.

.....from H.Middleditch

The observation about parking the pick-up on a stony hillock and then finding *G. eurypleurum* in the surroundings might suggest that this plant could have been growing on quite different ground to the sandy soil in which *G. mihanovichii* reputedly grows.

.....from D.Metzing

Our own route towards the Cerro Leon did not go via Fortin Teniente Martinez and Fortin Madrejon, which is the way Ritter probably travelled. From Filadelfia our route took us through Mariscal Estigarriba, from where we went more or less northwards to Dest. Gral.P.Colman. thence south-eastwards near to Cerro Leon. We did not find *G. eurypleurum* growing on stony ground, but on loamy soil, in two different populations. Here we also found *Castellanosia caineana* Cardenas, which is common in the western Chaco, and a species of *Frailea*, related to *F. concepcionensis* Buining & Moser. As you will see on the habitat photographs of *G. eurypleurum* Ritter, it is growing under similar conditions to *G. mihanovichii* i.e. under shrubs and trees among vegetation litter, on a loamy soil. If you look at both Figs. 214 and 215 in Ritters' *Kakteen in Südamerika*, you will see that they both have exactly the same background.

ON THE HUNT FOR SOEHRENSIA INGENS From H.Middleditch

In addition to the fairly well known *Soehrensia* species names of *S. bruchii*, *S. formosa*, and *S. korethroides*, the literature also includes the names *S. grandis* and *S. ingens*. There is a description of *Lobivia grandis* to be found in Britton & Rose "The Cactaceae", hence the designation *Soehrensia grandis* (Br. & R.) Backbg. On the other hand we have *Soehrensia ingens* Br. & R. ex Backbg; search as I might, I find no mention of the name *ingens* for any south american cacti within the pages of the four volumes of Britton & Rose.

.....from R.Mottram

The first publication of *Soehrensia ingens* was by Backeberg in the US C. & S.J. Vol.23 p.86 for 1951, in which he provides both a latin description and quotes a Type as Shafer No.23. In these two respects the description conforms to the then current ICBN requirements so that *Soehrensia ingens* Backeberg is a valid name. Backeberg also indicates that plate 58d of a plant photographed at El Molle, Tucuman, which appears in Castellanos & Lelong 1943, is this same sort.

.....from H.Middleditch

Under the heading of *Lobivia grandis* it is noted by Britton & Rose (Vol.3 p.59) that "Dr. Shafer's No.23 collected at the same locality is similar, but the flowers are much smaller, being only about 3 cm long, and the plant is much larger, up to 1.2m high". Evidently it is this Shafer No.23 which was selected by Backeberg to be his *S. ingens*. The original description of *S. ingens* by Backeberg states that this species is "globular up to 1.2 m high". In the reference to Shafer No.23 in Britton & Rose, only a height is quoted, with no indication of

globular or columnar form. It would naturally be very useful to be able to refer to the original Shafer Field Note Book to see if it contained any further information about Shafer No.23

.....from New York Botanic Garden Library

The Shafer field notebook on South American cacti has been located here. The opening page of notes is headed "J.A.Shafer. South American cacti 1916-1917" below which is written "Andalgala, Prov. Catamarca" followed by several lines describing the surroundings of that place. The actual entries are prefaced by the subheading "December 13, 1916" below which is written the No.1 entry, an *Opuntia*. It would seem that all the subsequent entries up to and including No.22 are plants collected in the surroundings of Andalgala. On the page in which the entry for No.23 appears, there is a heading above the entries which reads "Dec.28 started across mountains for Concepcion, prov. Tucuman about 140k". The 140k is followed by a word which is almost obliterated but it is possible that it may have been "kilometres"

The entry against No.23 reads as follows "Cereus? Cylindrical 2-4 ft x 8 in upright seldom in clumps bright green numerous spines long slender white. No, fls [flowers?] seen. On quartz-mica rock cliffs at about 7300-7500 ft altitude west side of range"

.....from H.Middleditch

It may be acceptable to take the brief "8 in" as it appears in the Shafer field notes to indicate eight inches, especially as a plant of 2-4 ft in height and eight inches in diameter would indeed be cylindrical, as stated by Shafer. Hence it will be quite evident from the Shafer field notes that in regard to Shafer No.23 we are dealing with a short cereiform, as opposed to a globular, plant. It is quite certainly not globular to 1.2m diameter, as stated by Backeberg in his original description of *S.ingens*. Hence the Backeberg description of a globular plant does not match the cylindrical Shafer No.23, which is quoted as the Type for *Soehrensia Ingens* in Backeberg's 1951 description for that species.

.....from C.Jeffrey, The Scientific naming of plants, 1968

The ICBN requires that the application of botanical names be determined by means of what are called nomenclatural types. The type of the name of a species, for example, is usually simply the herbarium specimen on which the original description validating the name was based. A name is permanently attached to its nomenclatural type. Thus, if a taxon is so circumscribed as to include the type of a name, then the name must apply to that taxon. If it is later decided that that the type of a name falls outside the range of variation of the taxon, then that name can no longer be applied to that taxon.

.....from H.Middleditch

The type for *Soehrensia ingens* Backeberg is a cereiform plant up to 1.2 m tall and 8 inches diameter, whereas the Backeberg description is of a globose plant up to 1.2 m diameter. Since the type of the name falls outside the range of variation of the taxon then the name *S.ingens* can no longer be used.

.....from J.Lambert

Soehrensia ingens is indeed said to attain 1.2 m height by Backeberg, quoting Britton & Rose. On all pictures published by Backeberg, the plants are globose e.g. Fig.1610 in *Die Cactaceae Vol.3* (Photograph by Castellanos) and Fig.389 in the *Lexicon* (Photograph by Schickendanz). The plant which I observed and photographed on the ascent of the Cuesta de Capillitas, (Fig. 232 in my book) looked exactly like the one in Schickendanz's first picture. The reason why I decided that this was *S.ingens* was the quite high rib count - more than 50! The only other *Soehrensia* with a similar high figure is *S.bruchii*, a species well known to me from the surroundings of Tafi del Valle, and quite different from *S.ingens*. *Soehrensia ingens* was also found on the Cuesta de la Chilca.

.....from R.Mottram

The original description of *S.ingens* Backbg included the observation: "I have seen photographs of this plant which might be called the "Argentine Echinocactus ingens". The tall plant illustrated by Castellanos and Lelong, 1943, plate 58d, from El Molle, near Tucuman may represent this species".

.....from H.Middleditch

The Kiesling reproduction of Castellanos' writings on cacti does not appear to include any plate 58d in the 1943 paper by Castellanos & Lelong, entitled "Opuntiales vel Cactales".

.....from R.Mottram

The plates originally accompanying the article by Castellanos & Lelong were not reproduced by Kiesling. They appeared in Vol.1 of the *Genera et Species Plantarum Argentinarum* by Descole. Plate 58d is of a lady who is holding a small *Parodia* and who is seated besides a large globular plant, possibly two feet or more in diameter and height, having perhaps as many as forty ribs, spination shortish in relation to the size of the plant. There is a vertical rock cliff close behind the plant which is surrounded by large boulders. The caption to this illustration is "Echinocactus (*Lobivia*) sp. and *Parodia* sp., Tucuman, El Molle, 29.1.1935 (BA 13501)".

There is a reference to a place name of El Molle in Paynter R.A., *Ornithological gazeteer of Argentina*, 1985, which reads "2900m on Quebrada Amaicha, 19km SE of Amaicha del Valle and 19 km NW of Tafi del Valle" and also gives the longitude and latitude of the place.

.....from H.Middleditch

The large-scale Argentine Automobile Club map of Tucuman province (received from J.Lambert) does indeed locate an El Molle, at the foregoing location. It is only 6 km to the west of Abra Infernillo. It does seem to be highly probable that the above Plate 58d was taken in this same location, since not only has *S.bruchii* been reported from there, but the large plant in Plate 58d appears to be a typical *S.bruchii*, i.e. globular. The supposition by Backeberg that this plant might be the short columnar Shafer No.23 from between Andalgala and Concepcion, would seem to be incorrect.

There are two photographs of "*S.ingens*" in Fig 389 in Backeberg's *Kakteenlexikon*. The upper photograph is a large, fine spined, globular plant with what appears to be a white flower, but is more probably

a yellow flower which has lost its colour in the process of reproducing the photograph. The lower picture does display the reddish-orange flowers as stated in the caption. It has already been noted by K.Preston-Mafham and party, and others, that *S.bruchii* is found with red flowers on the Tucuman side of the pass, yellow flowers on the Amaicha del Valle side of the pass, and orange flowers between. It does seem quite probable that the Kakteenlexikon Fig 389 pictures were taken on this route, i.e. not far from the El Molle site of the Castellanos & Lelong Plate 58d. In any case, the name *S.ingens* cannot be applied here as the habit of these plants falls outside the compass of the type description (vide Jeffrey, above).

Under these circumstances, Shafer No. 23 is not yet validly named. Has a plant which conforms with the Shafer description for Shafer No.23 been seen in habitat; or has any plant approaching this in appearance been seen in this area?

The collecting locations for Shafer No.23 to No.29 inclusive were along the road from Andalgala to Concepcion. It is also noted by Britton & Rose that this Shafer No.23 (=S.ingens Bckbg) was collected on 28 December 1916 at the same date and place as the original collection of Shafer No.25, *Soehrensia grandis*, at an altitude of 2400m., on the west side of the Cuesta Chilca i.e. on the ascent from Andalgala. From the same publication we see (p.57) that the type specimen of *Lobivia grandiflora*, Shafer no.28, was also collected December 28 1916, but at 1750m., on the east side of the Cuesta Chilca i.e on the Campo Pucara side of the Cuesta Chilca. Both collecting locations were "between Andalgala and Concepcion". It was noted both by G.Charles and K.Preston-Mafham (Chileans No.50) that at a location some 5km along the road to Singuil, after turning off the Andalgala to Concepcion road, plants of *Trichocereus huascha*, *Lobivia grandiflora*, and *Lobivia crassicaulis*, were to be found growing almost side by side. In addition, it was noted by F.Vandenbroeck that pink flowered plants of clumping, semi-globose form, were to be seen at approximately the same location. These pink flowers would appear to match the "showy pink flowers" quoted by Britton & Rose for the original description of *L.grandiflora*. It may be open to question whether this was exactly the same location at which Shafer made his collections on 28 December 1916. There may be other spots in the general area of the Campo Pucara at which these same plants might be found.

.....from L.Bercht

Looking at the slides which I took during my crossing of the Cuesta Chilca, together with my notes, the various cylindrical plants which I photographed were all a great deal more slender than the 200 mm body diameter [8 inches] quoted by Shafer. Indeed, it seems that none of them attained even half this body diameter.

.....from M.Lowry

In 1989 I acquired a plant labelled *Lobivia grandis* at a plant auction at Medway NCSS Branch. At that time it was about 8" tall and 4" in diameter. Growth on the main head was slow but an offset appeared at the base in 1990 and grew quite rapidly. So much so that over the next four years it pushed the main head over to one side so that it took on a leaning attitude. By this time the main stem had reached about 14 inches in height. It has never flowered. In April 1995 I removed the offset which was then about 4" tall and across, and already well rooted, in order to place it in its own pot. The main head was planted out in the greenhouse at Bishop Burton College at the same time and by September of this year it had grown by 3" in height and increased in diameter by one inch. The picture of *Lobivia grandis* shown in Abb 1611. Backeberg Die Cactaceae Vol.III, bears a striking resemblance to my plant before I removed the offset.

.....from H.Middleditch

Given time, this plant might even attain 1.2m in height and 8 inches in diameter! But this still leaves unresolved the identity of Shafer No.23. which is quoted by Britton & Rose as "up to 12 dm high". found between Andalgala and Concepcion on a cliff at 2400 m altitude. The route between Andalgala and Concepcion starts in the arid Pipanaco basin, travelling across the level floor of the basin towards the foot of the Sierra Machado. In the foothills of the Sierra Machado the road passes through the zone of bushes which extends some way up the climb to the Cuesta Chilca. In the latter part of the climb the ascent is quite steep and the road proceeds upwards in numerous zig-zags. Once over the pass across the Sierra Machado the road then descends into the Campo Pucara, a broad and more or less level basin almost entirely surrounded by high mountains. The Campo Pucara is largely grassland, with watercourses descending from the surrounding mountains and coming together into one single river which escapes from the Campo Pucara by a canyon through the Sierra Narvaez to the east. After the descent from the Cuesta Chilca the road then follows the general line of the main watercourse through the Campo Pucara. As the road goes east and northeast the vegetation becomes a little less arid, having the advantage of the overspill of rainfall from the barrier ridge to the east of the Campo Pucara. To get out of the Campo Pucara the road must climb the barrier ridge to the north and cross it by the Cuesta Clavillo, followed by a long descent into the Chaco plain. To the east of the Cuesta Clavillo the vegetation quickly becomes tropical forest.

There are relatively slender stemmed *Trichocereus* of *huascha* or *andalgalensis* affinity to be found both on the east and west sides of the Cuesta Chilca. *Gymnocalycium baldianum* likewise occurs both to the east and west of this divide. at elevated altitudes, *Parodias* also occur both sides of the divide over a range of altitudes, whilst *Lobivia aurea* is found likewise but at lower altitudes. *Trichocereus schickendantzii* is reported from various places in the Campo Pucara intermontane basin and south from there towards Catamarca. Consequently it would not be impossible for Shafer No.23 to be a form of *T.schickendantzii* from the west of the divide.

ON THE TRAIL OF ECHINOPSIS SPEGAZZINII From J.Lambert

In the course of my visit to Argentina in 1988 I was able to spend a few days in the northern part of Tucuman province. We travelled along the eastern side of the Sierra Medina and also visited the area around the hydro-electric plant at Dique el Cadillal. The main road which runs north from the city of Tucuman follows the broad valley of the Rio Sali; from this road we travelled along one or two of the side valleys in which the rivers run down from the Cumbres Calchaquies, which tower up to the west. Near Vipos, at an altitude of 800m, we came across an Echinopsis which carries my number JL-255.

On a further visit to Argentina in 1989, the opportunity was taken whilst travelling northwards through Salta province to make a small diversion to Cabra Corral. Here, at 1100m altitude, I met with another Echinopsis to which I gave my number JL-300. It was of generally similar appearance to the Echinopsis JL-255 which I had found at Vipos in northern Tucuman.

Initially I took both of these plants to be Echinopsis spegazziniana Britton & Rose. This name was given to the plants which were called Echinopsis campylacantha by R.Mey. There is a fine illustration of E.campylacantha R.Mey in Schumann's handbook; the photograph of E.spegazziniana which appears in Britton & Rose is also reproduced in Succulenta for 1924. My plants from Cabra Corral, as well as from Vipos, are a much better match to Schumann's picture than to the photograph of E.spegazziniana.

However, there is a problem with E.spegazziniana. This plant is described by Britton & Rose as 9cm thick with flowers 15 to 17 cm long. But on the photograph provided by Britton & Rose, the flowers are but slightly longer than the diameter of the body. If the diameter of the plant is no more than 9 cm, then the flowers measure no more than 10 cm in length. Or else, if the flowers are actually 15-17 cm long, then the body must be about 13-15cm in diameter.? In addition, the origin of this plant is given as Mendoza by Britton & Rose. I must say that the only Echinopsis which I observed in Mendoza was E.leucantha.

ECHINOPSIS CAMPYLACANTHA. - A TALE OF THREE NAMES. From H.Middleditch

During the time that he was resident in Mendoza, Gillies collected a large number of plants, including several cacti, and sent them back to Europe. A number of these plants found their way into the collection of Prince Salm-Dyck and one of them was named Echinocactus leucanthus in Salm-Dyck, Cact. Hort. Dyck, which was published in 1834. This same species was subsequently featured in an article written by Pfeiffer in the Allgemeine Gartenzeitung in 1835, under the heading of Echinocactus leucanthus Gillies. However, when Pfeiffer published his Enumeratio Diagnostica Cactacearum in 1837, he dealt with Echinocactus leucanthus not under that name but as Cereus leucanthus. This was due to a particular fad in which Pfeiffer indulged at that time, of amalgamating into the genus Cereus a number of specific names which other contemporary authors placed under Echinocactus, Epyphyllum, etc.

Shortly after the appearance of this name Cereus leucanthus, Pfeiffer and Otto were responsible for the publication of a series of coloured plates of cacti in flower, entitled "Abbildung und Beschreibung Bluhender Cacteen". These Plates appeared between 1838 and 1850, each accompanied by a bilingual text. In Volume 1 of these Plates, Part 1 was published in 1838 (often misquoted as 1839) and included Plate 4 which was of Echinopsis multiplex. A suitable commentary accompanied each of these Plates, but the text which accompanied Plate 4 also included a relatively lengthy reference to the new genus Echinopsis which had recently been established by Zuccarini. In addition there were listed in this same text the names of seven species which then became included in this new genus Echinopsis. Of these seven names, two species had up to that time been placed under Cereus, by Pfeiffer. One of these was Cereus leucanthus i.e. Echinocactus leucanthus Gill., the other was Cereus tubiflorus.

It was in this way that Pfeiffer transferred his Cereus leucanthus and his Cereus tubiflorus to Echinopsis. Not only did Pfeiffer change his generic name, but at the same time he also chose a new specific epithet. Thus he changed the name of his Cereus tubiflorus into Echinopsis zuccarinii Pfr., and at the same time he renamed his Cereus leucanthus, (previously Echinocactus leucanthus) as Echinopsis campylacantha Pfr. No subsequent problem arose with the name Cereus tubiflorus, for both Britton & Rose (Vol.3 p.67) and Backeberg in his Die Cactaceae (Vol.2 p.1289) simply list Echinopsis zuccarinii as a synonym of Echinopsis tubiflorus. In the Rep. Bot. 2;324 of 1843, Walper similarly listed Echinopsis campylacantha as a synonym of Echinopsis leucantha. But the story did not end there.

In the M.f.K. for 1895, on P.27, which I have open before me as I write, R.Meyer presents an article about Echinopsis campylacantha Pfr. In this article, Meyer observes that "Salm-Dyck first published this species, afterwards in the genus Echinopsis founded by Zuccarini, in his catalogue appearing in 1830, under its present name." In addition it is stated by R.Meyer:-

"An interesting and very detailed description by Pfeiffer of this fine species is to be found in the Allgemeine Gartenzeitung of the year 1835, of a plant taken from his collection, and that under the Gillies' name of Echinocactus leucanthus. The flower, whose original description will follow later, put this species in the genus Cereus, according to Pfeiffer, and specifically into the group of the Cerei globosi, in which E.turbinata, E.eyriesii, etc, would be included. In Pfeiffer's "Enumeratio Diagnostica" he presented it as Cereus leucanthus. We also possess, probably from Friedrich Otto, as a footnote to the above mentioned article by Pfeiffer, some interesting notes about the first introduction of the species discussed here, for which I must allow space here".

There follows a short extract from the 1835 article about E.leucanthus, which is then followed by a longer extract from the same article, giving a description of the flower. Having open alongside each other in front of

me both the R.Meyer article of 1895 (“*Echinopsis campylacantha*”) and the 1835 *Allgemeine Gartenzeitung* article on *E.leucanthus* Gill., it is perfectly clear that R.Meyer is quoting word for word from the 1835 article. Thus he is concerned with *E.leucanthus* Gill., but he applies to it the name *Echinopsis campylacantha* which was adopted by Pfeiffer, in Plate 4 of his *Abbildung und Beschreibung*. It is always possible that R.Meyer was not aware that Pfeiffer’s *Echinopsis campylacantha* had been revised to *Echinopsis leucanthus* by Walpers in *Rep. Bot.*, 2;324 of 1843.

The result of the publication of this 1895 M.f.K. article by R.Meyer was that there were then two different names for the same species. This could hardly have been obvious to Schumann, who treated the *Echinopsis leucanthus* Gill. and *Echinopsis campylacantha* R.Mey non Pfr as two different species in his *Gesamtbeschreibung* of 1903. When you are Director of the Royal Botanic Garden in Berlin, Editor of the *D.K.G. Journal*, and leading light of the Nomenclature commission for the D.K.G., there is not necessarily time to back check your references.

It was recognised by Britton & Rose that *Echinopsis campylacantha* R.Meyer non Pfr was a homonym of the original Pfeiffer name (although the name had been relegated to synonymy by Walpers), so they erected the name *Echinopsis spegazziniana* to replace *E.campylacantha* R.Meyer. Evidently they, too, had never read the 1895 article by R.Meyer and checked it against the 1835 article in *Allgemeine Gartenzeitung*, and so they must have been unaware that the *E.campylacantha* of Pfeiffer was identical to the *E.campylacantha* of R.Meyer. So we now had three different names for one and the same species - *leucantha*, *campylacantha*, and *spegazziniana*.

When you are producing a six-Volume Monograph on the whole of the Cactaceae, time can be rather at a premium, so it is hardly surprising that in his *Die Cactaceae* Backeberg continued the fallacy of *E.spegazziniana*, synonym *E.campylacantha* R.Meyer non Pfr., alongside *E.leucantha*. To tidy matters up, both *E.spegazziniana* Br.& R. as well as *E.campylacantha* R.Meyer need to be relegated to synonymy with *E.leucanthus*. But for this purpose it would be desirable to provide a correct bibliographic reference to the very first publication of *E.leucanthus*. But R.Meyer in his 1895 article says that “Salm Dyck first published this species in his catalogue of 1830”. Herein lies a further problem, as my own references to the publications which catalogued the collection of Prince Salm Dyck suggest that the first edition was in 1834 and the second edition was 1850. So where does “Salm-Dyck 1830” fit in?

....from R.Mottram

There are in fact rather more than two editions. By reference to G.A.Pritzel, *Thesaurus Literaturae Botanicae* Ed.2 of 1872, one finds listed a total of no less than six versions or editions. The first “*Index plantarum succulentarum in horto Dyckensi*” appeared in 1822, with a second edition in 1829. These are simply checklists of names only, without descriptions. Then in 1834 came *Hortus Dyckensis*, catalogue of plants cultivated in the Dyck Botanic Garden, followed in 1844 by *Cactae in Horto Dyckensi*, with a second edition in 1839 and a third edition in 1849. In addition, according to Stafleu & Cowan, there was yet a third edition of the *Index Plantarum* published in 1834. Unfortunately not a single one of these is dated 1830, as quoted by R.Meyer.

.....from G.J.Swales

I understand that the Salm-Dyck Library continued to be in existence until a few years ago, when all the books were sold off. These included almost a dozen catalogues, listing the succulent plants - and then the cacti only - in the Salm-Dyck collection. These various catalogues were dated between 1809 and 1850 but none of them was dated 1830.

.....from H.Middleditch

Which appears to lead to the conclusion that the reference by R.Meyer to “Salm-Dyck 1830” was an error.

.....from J.Lambert

The more one explores the documentation, it is hardly surprising that the more doubtful one becomes of the validity of *Echinopsis spegazziniana*. It is indeed a mystery to me how Schumann finds that Meyer sharply distinguishes his “*campylacantha*” from Pfeiffer’s one! It looks as though *E.leucantha* has been re-described under these two names of *E.campylacantha* and *E.spegazziniana*, which should be invalidated.

....from H.Middleditch

One thing that does tend to bother me in the photograph of *E.spegazziniana* in Britton & Rose, is the extent to which the outer petals on the flowers are bent right over - fully recurved. The tips of the petals point down towards the base of the flower tube. My impression is that on plants of the *E.leucantha* complex, the flower petals tend to open flat like a plate, whilst on *Echinopsis* outside the *leucantha* group, the outer flower petals reflex, as in the Britton & Rose picture of *E.spegazziniana*.

....from J.Lambert

If you care to look at Schumann’s Fig 46, drawn by Gurke, of “*E.campylacantha*”, it distinctly shows flowers with stamens grouped in a single compact bunch, which is quite exceptional in *Echinopsis*, and known only from *E.rhodotricha* (= *E.chacoana*) and *E.leucantha*. My slide of an *Echinopsis leucantha*, taken near Colalao, to the south of Cafayate, shows two fully open flowers, with the outer petals bent well below the horizontal. There is also a photograph of “*E.spegazziniana*” in a 1926 issue of *Succulenta*, with the outer petals reflexed.

....from H.Middleditch

It appears that we can now say that JL 256 is not *Echinopsis spegazziniana*, but we still need to find an appropriate identification for it.

LOSING BUDS ON TEPHROCACTUS FLOCCOSUS From K.Gilmer
At the 1993 Chileans' Weekend

This year one of my plants from the floccosus group showed flower buds for the first time. It was early in March when I first discovered these buds, which were then already about 5 mm across. Consequently a few days later I began to water this plant; during the course of the following days a total of 19 buds appeared!. Three weeks later, all these buds began to die off, and not a single flower opened. I do not know the reason for this, the more so because the segments were growing well. Perhaps I should not start to water this plant as soon as the buds appear? Or perhaps I ought to start watering before the buds appear?

.....from H.Middleditch

Is it possible that *T.floccosus* may grow under the same habitat conditions as *Oroya*? Problems with buds aborting on *Oroya* early in the growing season were reported by several members in Chileans No.43 whilst habitat observations on *Oroya* were reported in Chileans No.45. If the nature of the ground and the climatic regime was similar in both cases then the problems with losing young buds on *T.floccosus* may have its origins in just the same cause as the loss of young buds on *Oroya*.

.....from G.Frank, Through the Cactus Paradise of South America, Succulenta 6.1959

From Lima to Cuzco, the former indian capital in the Andean mountains, I took the longer inland road, a road which was already in use at the time of the Inca empire. One week was required for the trip of about 1000km with the locally irregularly operating buses. It was worth while, in spite of the problems. The road ran right across the Andean mountains, rising up to the bare altiplano as far as almost 5000m with breath-taking views and then went down endless hairpin bends to the subtropical valleys with picturesque indian villages and sleepy looking towns of the Spanish colonial period. The numerous small white spots of snow on the grassy slopes between 4000m and 5000m altitude turned out on closer examination to be giant colonies of the densely white haired *Tephrocactus floccosus*. As a regular companion I almost always found one other sort of cactus at this altitude - *Oroya peruviana*, the colour of whose spines varied from brownish yellow through deep red to almost black. Around the mining town of *Oroya*, the recognised finding place of the Type in the literature, I saw hardly a single plant. By contrast, however, there were plenty much further to the south on the altiplano between Huancayo, Andahuaylas, and Ayacucho.

.....from H.Johnson, A collecting trip in Peru, K.u.a.S 3,1952

[Between Ayacucho and Andahuaylas] *Oroyas* predominate on the plateau, in greater numbers than those encountered further north, and they grow in the most awkward of places, on marshy ground amongst grasses and in rocky or stony sites; we estimate their number in millions. *Tephrocactus floccosus* grows here as many varieties. They vary in size and form, length of hair, and in the colour of the hair from pure white to darker yellow. However, the flowers are similar overall.

.....from W.Rausch, G.O.K. Newsletter January 1971

The picture of a herd of llamas in the wild can be seen anywhere among the huge mountain peaks up to as far as the snow line, which runs at an altitude of about 4600-4800m here in Peru. It is painfully cold - some degrees below zero - and that in the southern Spring! Up here, in the icy desert of stones, there are no more cacti - or so the literature leads us to believe. But - there are some! Thus at 4600m altitude, huge cushions of *Tephrocactus* sp. R.428. From a distance it looked like a boulder. It has been classified as *T.lagopus* or *T.floccosus*, but perhaps it is something new. It is clothed with a dense, yellowish coat of long fluffy wool and its yellow flowers, also the fruit, stand well down in the woolly coat. *Tephrocactus lagopus*, R.386, with orange to red flowers, has shaggy hair. *Tephrocactus floccosus*, R.399, R.400, has thick white wool, it makes larger stems, its orange to yellow flowers project above the cushion like an offset. Also from close to the snow line comes this picture of an unusual, stone-hard, low growing cushion plant, which looks just like a green hummock of moss: *Azorella yarita*. On thin pasture land at 2500-3500m is found *Oroya*, in surprising abundance, forming cushions, solitary up to head size, with spines from brown or reddish brown to white or silver grey, the spination more open or more dense, the flowers red or more yellow, the flower petals tending to red on the outside, yellow down to the throat, or even clear yellow flowers but those are relatively rare. On account of this diversity, authors who are not familiar with what is found in habitat, are misled into giving names to individual forms.

.....from F.Vandenbroeck

The only occasion on which I was able to see *Tephrocactus floccosus* in flower was near Warisata, above Achicachi, on the road to Sorata, in the month of November. Of the plants I saw when we travelled in Peru in the months of June, July, and August, none were in flower, but we did see specimens with fruits. As far as I recollect we saw *T.floccosus* around Recuay-Huaraz, also between Juliaca and Abra La Raya, between Chalhuanca and Yauriviri, and around La Oroya. On the high Andean plateau in Peru we saw on many occasions *Oroya* and *T.floccosa* growing together. I payed particular attention to this phenomenon in the area of Recuay because *O.borchersii* is very numerous there and furthermore the region is interesting for the stands of the famous *Puya raimondii*. It is interesting to observe that *O. borchersii* was in flower in the wintertime i.e. in the dry season, whereas *T.floccosus* probably flowers in the wet summer season. When *Oroya* is in flower, *T.floccosus* is already bearing fruit! The same phenomenon of winter flowering may also be observed with *Matucana*; I saw many *Matucanas*, especially of the *haynei* group, in full flower in winter time. Travelling from Titicaca to Cuzco, large white hummocks of *T.floccosus* may be seen at many places on the Puna. In the distance they resemble flocks of sheep. I saw *Tephrocactus lagopus* growing on stony slopes as well as on level grassy fields. The grassy fields may be turf-like with the coarser *itchu* grasses forming conspicuous scattered tufts. As *T.floccosus* is growing at altitudes around 4000m, bushes are always absent. This species may even be seen growing in the streets of smaller villages where they cling to the base of stone or adobe

walls. In southern Peru it seems to be the custom to plant the species on the top of adobe walls, such was the case in Pucara.

.....from K.Preston-Mafham

There is no doubt that not only do both Oroya and *T.floccosus* grow under similar conditions, they also grow quite close to each other. When we were travelling in Peru we often found them both growing only a few yards from each other. So that it is probably quite right to suggest that one aspect of adverse cultivation is common to them both. We were there in February which meant that the rainy season was not yet over and we found both these sorts growing in a quite peaty like black soil which was so full of water that it might even be described as sopping wet. The *Tephrocactus floccosus* were in flower at that time and also had plenty of ripe fruits. The *Oroya borchersii* had lots of ripe fruit pods but no sign of flowers or buds. Thus the Oroyas flower in springtime i.e. September through to December, or even later, depending on how long the fruits take to ripen, while individual *T.floccosus* plants flower for months on end. The altitude is very high, so possibly lack of ultra-violet light in our surroundings may have an influence on flowering.

.....from R.Senior

It was in August that I had a trekking holiday in Peru. We flew to Lima and then went onwards from there by coach. We had two 7-day treks, the first one from Cuzco to Macchu Picchu and then a second one from the Bolivian shore of Lake Titicaca at the Tiquina Straits. The first trek started off at Chilco through part of the Vilcabamaba valley, towards Ollantaytambo. It was planned to follow some old Inca trails but as we approached the Huayanay pass after a trek of some 16 km, we had to adopt a diversion because at about 16,000 ft the intended route was blocked by snow. The last overnight camp was on a steep mountainside with the surroundings covered by snow. We did start off climbing from there but after we ascended a further 300 or 400 feet the blizzard set in and our guides suggested that we retrace our steps as the snow was too deep for the mules carrying the provisions and camping gear.

On the ascent we had come across *T.floccosus* starting at about 14,000 ft altitude. The first clump I saw, which was not in flower, had such large hairy bodies and such strong yellow spines that I thought it was a small *Oreocereus*! This clump was a good 1000 feet below the main habitat and I imagine derived from an offset carried there and dropped by chance by some animal or a human. That clump was about 12 inches across and heavily interlaced with grass, the individual bodies being about 1.5 inches across. On the parts projecting from the grass and in full sun, the wool was very dense and the pale yellow spines were $\frac{3}{4}$ to one inch long. The plants at higher altitude were rather smaller bodied. Some had shorter yellow spines and on some the spines were not obvious at all.

I suppose that most of the plants occurred within an altitude band of 400 to 500 feet, vertically. We continued to come across these plants all the way up to the snow line at about 15,000 ft. There was at least one clump in flower, not only with snow all around, but some of its roots were visible and these were in running water from the melting snow! Individual heads were rare, the smallest clumps being of three or four heads, whilst the largest clump would be up to 3 feet across. Clumps of 18 to 24 inches across were common. In some areas clumps were very common whilst in other similar areas, they were quite sparse. Generally where the *floccosus* occurred there were clumps of various sizes every two or three feet or even closer. At some spots there were many plants, sometimes only a foot or so apart from each other, of various sizes. Clumps occurred amongst dessicated grass and low growing, dormant, or dead shrubs; but in other areas the *floccosus* occurred amongst stone only, without other vegetation. The whole area was littered with scree type debris. As I recall it, the surface rocks were a fine grained pale granite with occasional quartz. Where they did occur, the plants grew on flattish ground rather than on sloping hillsides, but when they did grow on sloping areas these were facing equally to all points of the compass.

From seeing the plants in their environment, I was struck by two things. One, the severe cold at that altitude. Secondly, the wet conditions even with the cold. There were two things I could not "see" - the U.V. light intensity and the heat plus aridity of the hot days. But I am now convinced that these plants need more wet and more cold than I have previously given them.

Some of these plants formed what I would describe as huge clumps, bits of which had been broken off and trampled upon, presumably by the feet of llamas, mules, and the natives, so I was able to rescue one or two of these detached pieces. On my return I potted them up individually and waited. After two or three weeks in the greenhouse they were obviously starting to become dessicated. Should I graft? Instead, I watered them and put them outside to get as much light as possible at sea level here. It rained, as only Cornwall can, on them. Roots appeared in November/December. They plumped out, grew in the cool days and in the light frosty (30°F) nights of November. Every single one of them. During the lower temperature days and nights of January and February (down to 27°F) they were kept on the south side of the greenhouse receiving record amounts of rain for Cornwall and yet still looked in good shape. Unfortunately a green cone with small leaves is growing through the hairs. I think I will keep them in for the summer, hot and dry, to try to initiate the hair again.

.....from F.Vandenbroeck

We were in Peru in winter time and I never saw snow near *T.floccosus*. I suppose this would not have been likely because winter time is the dry period in the Andean regions where this species has its natural habitat.

.....from R.K.Hughes

The Inca trail from km 88 past Ollantaytambo to Macchu Picchu is a main tourist trekking attraction. The *T.floccosus* which I found near Cuzco were all on rocky islands among farm land and the ground was not steeply sloping. The altitude I estimate was about 3700 to 3900 m although elsewhere these plants are said to grow between 3500 to 4500 m. August is the middle of summer for us so it is the middle of winter over there.

Their summer is January, February and March, which coincides with the wet season. I do believe that I have read somewhere that *T.floccosus* flowers in the dry cold winter whereas most other cacti there flower in November before the rains start in December.

.....from K.Gilmer

Slowly but surely more information is coming together about *T.floccosus*. Even if the plants do grow well under our normal cultivation, I am becoming steadily more certain that we are not familiar with their optimum requirements. Over the winter of 1993/94, as an experiment, the compost was not allowed to dry out with most of my plants of the *floccosus* group, as has been done in previous years in accordance with the normal method of cultivation for most cacti. Throughout the whole of the winter the compost was kept more or less damp, as an experiment. The greenhouse is glazed with twin-wall plexiglass and heated only to maintain a minimum temperature of between -2° and +3°C. The results were most encouraging. There were no casualties, all plants remained in growth for the whole of the winter and did not shrivel up at all. It was interesting to see that the stem growth in the winter was just as stout as in the summer. Even the hair was equally long and thick. And this, despite last winter often being dreadful weather here and the sun only rarely putting in an appearance.

The plant which I spoke about at The Chileans' Weekend was likewise kept damp throughout the winter for the first time. In Spring, about March, it produced about 80 flower buds! But unfortunately they came to nothing this year as well. All the buds came to a stop at a size of about 15 mm across, at the largest. Some of these buds hung on even up to today (July), still green, but the tip with the tiny flower petals has dried up. Further experiments will be needed and I am very glad to have the information from the two visitors to Chile.

Some of my *floccosus* type plants were overwintered out of doors without any protection, so that the soil was always wet. At temperatures down to -8°C there were no problems, but after a few nights in November with temperatures down to -17°C all the plants were lost. Another grower kept some plants in an unheated greenhouse which is glazed with glass. Some of the plants were in dry compost, some were kept moist. When the temperature went down to -15°C all the plants were lost.

.....from A.Johnston

One or two rooted cuttings of *floccose* *Tephrocacti* were put into my unheated greenhouse and kept dry over winter. They survived without any problem, so several more rooted cuttings were then added. However this last winter has been much colder than these plants have faced before, down to minus 20°F, and they have obviously suffered very badly indeed. It is questionable whether they will survive.

.....from W.Geissler

With *Tephrocacti* I have found that it is crucial to keep absolute observance of the resting period with no water at all. Later, when buds have formed, water can be given slowly and increased until full watering can take place in high summer.

.....from K.Gilmer (later)

This summer four plants from the group around *Austrocyllindropuntia floccosa* flowered in my greenhouse for the first time. You will remember that when I came to your Chileans' Weekend I reported about one of my plants producing flower buds on more than one occasion, but they always died off before the flowers opened. Now this plant has flowered.

Previously I had watered these plants in the summer with the rest of my collection, allowing them to go dry for the winter. Then I tried keeping their compost damp the whole year round, when the plants grew better than they did before, but still lost their buds. So if neither of these cultivation regimes was successful, there remained only one alternative viz: a dry summer and a wet winter. I had noticed in the summer of 1994 that my *A.floccosa* stopped growing for some weeks, even though they were being watered during this period. At the end of May 1995 these plants again looked as if they had stopped growing and this time watering was discontinued, even though the temperature was above 35°C! About four or five weeks later all four plants showed buds and then after a further four weeks, at the end of July (still without having been watered) the first flowers opened. The plants which originated from Heidelberg Botanic Gardens, Rauh Nr.66745, produced red flowers; could this be the same as the *A.machacama* of Ritter? The other plants were from Schleipfer's nursery, received as *A.lagopus v.aureo-penicillata* and they produced an orange-red flower.

.....from H.Middleditch

In the months of August and September the rain-bearing winds from the Atlantic follow the sun southwards; from October onwards the overhead sun continues to travel south from the equator and the rain bearing winds then invade Amazonia, bringing rain to the eastern side of the Andes. In the high Andes of Peru the monthly rainfall does show an increase in September. The observation by R.Senior that *A.floccosa* was found in flower in the month of August would clearly suggest that these plants flower before the onset of the wet season - the warm summer in habitat - after the cool, dry winter. The experience now reported by K.Gilmer indicates that in cultivation in this hemisphere these plants will flower if given a cool, moist winter and a warm, dry summer. This climatic regime is quite the opposite of that in habitat

.....from A.W.Craig

So these plants must flower in accordance with their built-in clock, which they have not adjusted to the northern hemisphere. This is hardly surprising as my south african succulents behave in just the same way, lying more or less dormant in summer and growing over the winter.

.....from H.Middleditch

At the same time, the red flowers reported by K.Gilmer and the yellow flowers reported by R.Senior would bring into question the comment made by H.Johnston that "the flowers are similar overall".

.....from K.Preston-Mafham

There were both red and yellow flowers to be seen on *Opuntia floccosa*, but at quite different locations. There were plants with orange-red flowers to be seen in the Cordillera Blanca where they were growing in the

company of *Oroya borchersii* and *Puya raimondii*, whilst near the Laguna de Llanganuco, in the Cordillera Blanca, were plants with pure red flowers which might well be regarded as *T.yanganucensis*.

.....from H.Middleditch

In Rauh's Peruvian Cactus book there appears the first description of *T.yanganucensis* from 3000m in the Quebrada Yanganuco, Cordillera Blanca, and *T.hirschii* from 4000m in the Quebrada Queshque, Cordillera Blanca, both with carmine red flowers.

.....from A.Johnston

I have a small piece of *T.malyanus* which I have been trying to root down and nothing I have done has persuaded it to put out any roots.

.....from W.Rausch, G.O.K.Newsletter February 1972

On the 4000m high plains in these mountains live the llamas - and now we see the first cacti. Huge cushions of *Tephrocacti*, which we can see from a distance looking like llamas lying in the grass. They are large, compact, stoneward cushions of *T.malyanus* and the more open cushions of *T.floccosus* and *T.lagopus*. These high plains are completely deserted; it is often possible to wander the whole day long without meeting up with a single human being.

.....from H.Middleditch

If we are to rely on this observation, it would suggest that *T.malyanus* adopts a different form of growth to other, superficially similar-looking, *Tephrocacti* found in the high Andes of Peru. The "stone-hard" cushion is reminiscent of the mode of growth of *Azorella*. This may suggest that the cultivation of this species should be different again in some respect.

REICHEOACTUS REDISCOVERED?

In Chileans No.51 p.127 there were some notes from K.Gilmer regarding an interesting plant found near Fiambala, Argentina. No data was available at that time on flower, fruit, or seed; but it was noted that a collected plant of this sort was being grown in cultivation by Rausch

.....from K.Gilmer

We have recently paid a visit to Austria when we also met W.Rausch. He told us that his specimen of the plant we found in 1990 at the Type location of *Tephrocactus geometricus* (Angosto de Guanchin, prov. Catamarca), our "Reicheocactus", flowered for the first time this year in early summer in his greenhouse. The flowers appeared not from close to the growing point, but out on the shoulder. We were also told by W.Rausch that it was a typical *Lobivia* flower, the colour of the petals being yellow and the stigma red. Now that we are aware of the flower features, together with the seed which we found on our 1994 trip, he is sure that this new plant is a variety of *Lobivia famatinensis* and not *Thelocephala reichei*.

.....from H.Middleditch

At the moment I have no *Thelocephala* out in flower in my own collection. Whereabouts do the flowers appear on *Thelocephala*?

.....from R.Ferryman

Although I have been fortunate enough to see hundreds - and possibly thousands - of *Thelocephala* in habitat, I have only ever seen one plant carrying a flower, and that was a *Thelocephala krausii*, where the flower was close to the growing point. There does not appear to be a particular flowering season for *Thelocephala*. The view that has been conveyed to me is that these plants will flower when there has been a sufficient local fall of rain. Most *Thelocephala* are effectively level with the surface of the ground, but there are some species which do grow short columnar in habitat. Of course grafted specimens will grow quite elongated in cultivation, nine or ten inches tall. But even on their own roots, *T.duripulpa* will grow several inches high and the flowers then tend to appear rather more from the shoulder.

.....from F.Kattermann

Certainly I have been able to see some *Thelocephala* out in flower in habitat, and they always flower from near the growing point, never on the older areoles.

.....from H.Middleditch

Of the illustrations of *Thelocephala* in flower in "Eriocyce" by F.Kattermann, 1994, a good proportion give the distinct impression of flowers arising from close to the growing point. However, on Plate 16 p.85 of that book there are two pictures of *Thelocephala duripulpa* (Nos. 1 and 3) each with a pair of flowers situated right at the shoulder. On FK 72 the stigma lobes are a fairly bright pink, whilst on FK 80 they appear to be a creamy-yellow colour. Either plant would pass quite well for a smaller version of that illustrated on the front cover of Chileans No.51.

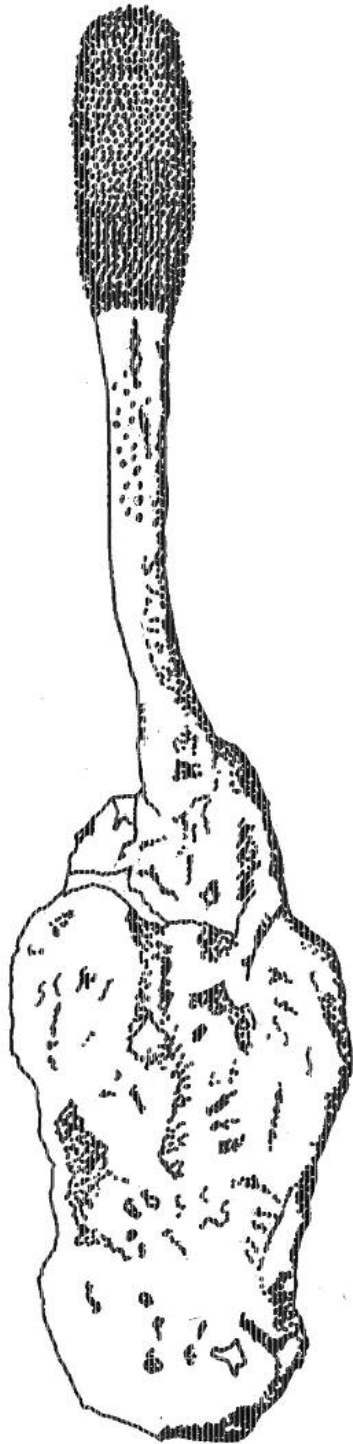
.....from C.Holland

In regard to *Thelocephala* which tend to grow elongated, I can only speak for plants in my own collection. A low growing habit has been retained by *malleolata*, *solitaria*, *mebbesii*, *napina*, *monte-amargensis*, *odieri* (even when grafted on to *Peireskiopsis*) and *tenebrica*. Elongated growth has occurred on *imitans*, *glabrescens*, *aerocarpa*, and on several *reichei*, all on their own roots and all grown in semi-shade.

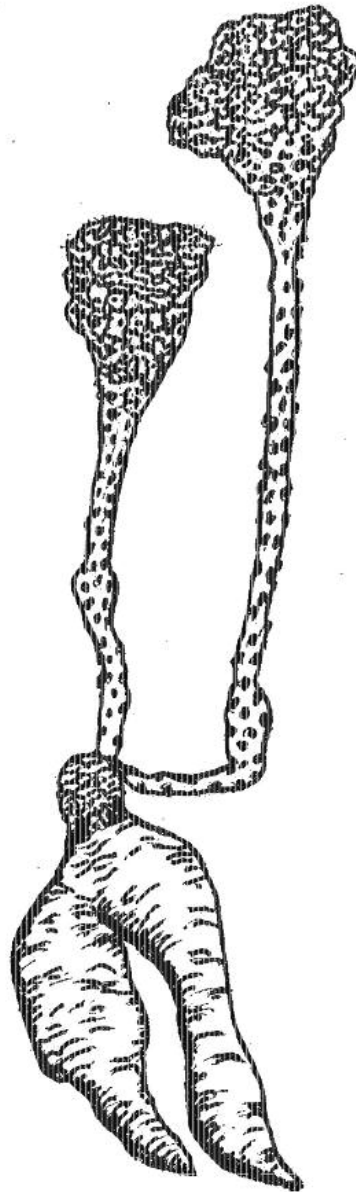
.....from G.Charles

On our visit to Argentina in 1996 our route started and finished at Mendoza. Most of our travelling was within the provinces of Mendoza, San Juan, and La Rioja, but we did make one excursion into Catamarca province, going via Tinogasta to Fiambala and then westwards along the valley of the Rio Chaschuil. After we left Fiambala the road followed a modest gradient for most of the way, fording across the river at intervals. The valley bottom was fairly flat being anything between one and two hundred yards wide. There was very

Thelocephala reichei



Fiambala
K.Gilmer



SH 807
E.W.Barnes

little water in the river bed which was largely filled with stones and rocks of various sizes. Near Fiambala there were gnarled low-growing trees in the valley, but the vegetation became sparser and sparser the further west we went. Following advice from K.Gilmer, we stopped at about 30 km west of Fiambala in order to look for *Lobivia famatinensis*. Here there were still low trees in the valley bottom but the vegetation was almost non-existent on the slopes apart from a very few dwarf bushes below knee height and rare tussocks of dry grass. At the foot of the valley sides there was an occasional *Echinopsis leucantha* and creeping chains of *Opuntia* grew here and there.

Climbing only a short way up the sides of the valley we could then see the mountain peaks at a considerable distance away. The ground on which we now stood was in the form of long, thin fingers running from the higher ground further away and pointing towards the valley bottom; these fingers were almost flat on top with very steeply sloping sides. Ascending the sides up this exceedingly steep gradient almost involved

using hands as well for balance. In addition, as the sides seemed to be formed of nothing but loose rock and stones, the ascent - although short - had to be undertaken with considerable care. One having reached the top, the surface was now largely made up of small stones, level from one side to the other, sloping gently towards the valley. This ground was nearly completely devoid of vegetation, where the sand had been eroded to leave a stony surface with sand under the stones; but we did find one or two *Pterocactus* there, together with *Tephrocactus geometricus*.

We had not found any *Lobivia famatinensis* down on the floor of the valley, nor did we find any on the flat-topped meseta-like ground. But only a short distance over the edge, among the rocks on the steeply sloping sides, we did find examples of these plants. There were one or two growing a few paces from each other but most of them were several yards apart. We had to really search for them and probably found about twenty plants all told. They were all growing elongated to some degree, the longest one being perhaps not far short of 20cm long. Almost all of those that were about 15cm or more in length were lying on the ground and one or two of these were putting out a branch part-way along their length. Plants of some 10cm in height were growing upright.

There were no flowers to be seen but we did find ripe fruit on two plants and were able to collect the seed. From this we had the impression that the plants might have been in flower about a month before the time of our visit in early December.

.....from R.Ferryman (later)

In the course of our 1997 visit to Chile we were fortunately able to see a number of *Thelocephala* in flower - one plant in particular growing above the surface of the ground had a couple of flowers which were not close to the apex at all - in fact they were almost on the sides!

RUBBISHING THE CACTI From Mrs. G.Craig

During our recent visit to Chile we were looking at some cacti just on the outskirts of Huasco. There was already a ribbon of weekend homes on the coast and this site was already laid out for the construction of further houses, with white lines marked on the ground by using crushed seashells. Presumably when the builders arrived they would clear the site and simply dump the *Neochilenia* that were growing there. If any amateur collector wished to conserve these plants by removing them before the arrival of the builders and put them into a greenhouse, it would presumably be a contravention of CITES Regulations. It does seem rather ridiculous that this is the situation we find ourselves in. Again when we were at Antofagasta, we were walking past the town rubbish dump, when we were fortunate enough to find plants of *Neochilenia residua*. It would not be very long before the steady advance of the rubbish dump would cover these plants and they would be lost for ever. This was not the only tip where the rubbish was spreading over the cacti. Little did I realise beforehand that as a result of supposedly going on holiday to Chile I would become a connoisseur of their municipal rubbish tips.

.....from H.Middleditch

Although the Cites agreements are intended to conserve the world's natural flora and fauna, it would appear that they only address one aspect of the problem and ignore completely mankind's despoilation of his environment as instanced by the above report. If any of the plants uprooted in the course of that development were brought to Europe for greenhouse cultivation it would be a breach of Cites regulations - regulations supposedly intended for conservation purposes! In the last issue of the *Chileans* we did report a rather peculiar comment which came from Germany but originated in Austria to the effect that information is kept from anyone in the UK as "only trouble comes from there", presumably meaning trouble from CITES officialdom..

.....from R.Ferryman

On a sad note, on a recent visit to Germany and Holland I was told "The English are bad news" and the shutters had been put up against us visiting a number of collections. This may be a result of action by CITES who have confiscated plants in three continental collections that I am aware of. Discussion on how CITES got to know of their existence concluded there were two possibilities, one a tip-off, or two, publication of field numbers. This CITES action initiated by a few well-meaning but quite poorly informed people has probably adversely affected our learning and understanding of our plants, as suggested in *Chileans* No.53

.....from B.Bates

In early summer I was able to make a visit to various cactophiles on the continent and I must say that I was very hospitably received at each of the several collections we visited in Austria. There was no reluctance to let us have habitat data, but this was purely on a person-to-person basis. There was talk about some collection or other having been raided by local CITES officials and there was obviously no small concern about information getting into the wrong hands, which might lead to any one or other of those I spoke to suffering from the unwanted attention of anybody from CITES..

.....from H.Middleditch

The review of *Gymnocalycium buenekeri* in *Chileans* No.53 indicated that wholesale collection of these plants probably 20-30 years ago had decimated the known population, leaving only remnants. It may be imagined that one objective of the CITES controls was to tackle such habitat spoilation by commercial interests, but available evidence suggests that *Uebelmannia* still exist in larger numbers in habitat than do *Gymnocalycium buenekeri* - and which has greater CITES protection?

In *KuaS* for May 1997 there was reported a seizure of 541 Mexican cacti flown in to France by a German landscape gardener - the sort of activity the CITES regulations were surely intended to contain. However the

application of these regulations (to which interested academics are not an insignificant party) offers little glimmer of support to any amateur growers who are desirous of obtaining a few voucher specimens in habitat, of cultivating them with due diligence, and of perpetuating their existence by propagation. The recent step towards "harvesting" ivory whilst African Elephants continue to enjoy adequate conservation, is an example that might advantageously be extended to other fields.

.....from P.Bint

It has come to my notice that the well-known collection of Lithops built up over many years by D.Cole apparently outgrew the owner's available time in its need for care and cultivation. In order to put it into good hands it appears that it was largely transferred to the care of Pretoria Botanic Gardens whilst a selection of specimens went to a south african nursery who wished to use the plants for seed production. The latter plants are reputedly thriving, but I understand that when D.Cole made a subsequent visit to Pretoria Botanic Gardens he found that his collected plants there had virtually disappeared, presumably due to inattention to their proper cultivation.

.....from H.Middleditch

There may appear to be an anomaly in permitting academic interests to harvest cacti whilst their commitment to subsequent care, cultivation, and propagation may be open to question. At the same time interested amateurs are severely restricted if they wish to obtain voucher specimens when their track record of care, cultivation, and propagation appears to be seldom tarnished.

SHARP PROBLEMS? ACIDIC ANSWER?.....from R.Gooch

After the interesting discussion with D.Angus about his problems with the grit, which eventually turned out to be decidedly alkaline, it occurred to me that I was having difficulty in rooting cuttings and 'lost-root' plants in a newish propagating frame in my potting shed. There is 2.5 inches of sharp sand over the heating cable in the propagator. A pH test was made on this sand, very shortly after our return here. Result - dark blue - a pH of over 8! So this may well be the cause of my problems. Steps were taken straight away to find an alternate - and suitable - supply of sand.

.....from P.Down

Unfortunately I have never been able to collect enough rain water to meet all my summer requirements so I have to use tap water. As a result of changes made by the local water company, our beautiful soft water is now a thing of the past. I began to suspect that this was having an adverse effect on the growth of my plants and so I started to use either Phostrogen or Miracle Grow in order to acidify the water, which is now very hard. There is no doubt in my mind that over the last two years it has brought about a real improvement in general growth.

.....from H.Middleditch

The Austrian "Gymnocalcium" publication carries a report of a number of habitat soil samples which have been brought back from a field trip and analysed. This report (by Dr.Huber of the Pharmaceutical Chemistry Institute, Graz) makes no reference to how the pH was measured, i.e. whether by a pH meter or by some other means. Nor does it mention anything about agitating the soil sample in order to produce a solution on which a pH measurement can be taken. It does refer to preparing a suspension of the sample in a solution of one molar potassium chloride in demineralised water i.e. 74.5g of potassium chloride in one litre of water. This appears to be a departure from the accepted procedure for measuring pH of a compost. (See Chileans No.53 p.94 et seq.)

.....from H.Huber

All the results reported in that article were indeed obtained by the use of a pH meter. The method you outline of agitating the soil sample in water, then allowing it to stand and repeating this procedure before testing the sample for pH, is absolutely correct. To achieve good results, please try the following procedure.

Take a sample of the mixture in which the cacti are to be planted, crush it and leave it to dry for several days (preferably for a week) in the air. Take about 50g of the mixture in a beaker and add to it 125ml of the one molar potassium chloride solution. Shake or stir, allow to stand for at least half an hour; stir again and then allow to stand for as long as sedimentation is taking place. When the solution is clear test for pH with the electrode of the meter.

The use of the solution of potassium chloride is necessary because of ion exchange. In measuring pH it is the concentration of H^+ ions in the solution which is measured. Materials like peat or loam hold back a considerable number of the H^+ ions which we should be measuring. These can be separated from those components by the potassium ions K^+ which attach themselves to the peat or loam in preference to the H^+ ions which are thus released into the solution and so become included in the pH measurement.

.....from H.Middleditch

But if the H^+ ions which are released by the K^+ ions would otherwise be locked into their parent material, presumably they are not available to the plant roots and hence should be excluded from any pH measurement. Samples of soil from four places in province Buenos Aires which were tested by Dr.Huber using the method he describes gave pH values of between 3.80 and 4.30 which do appear to be exceedingly acidic. The relatively high potassium content of the phostrogen used by P.Down may well have performed the useful function of releasing previously unavailable H^+ ions present in the compost; had a pH measurement of the compost been taken before and after the use of phostrogen (making a solution with water only), a distinct change in pH would have been expected, which would probably not have shown up if the method used by H.Huber had been adopted.

....from J.Cooke

In general I see no reason why plain demineralised water, or distilled water, should not be used for producing a liquid solution of any compost in order to measure pH. The procedure using Potassium chloride KCl will very probably increase the available H⁺ ion content and hence lower the pH by about one unit. The pH values quoted are very low; pH 3.5 would probably correspond to pH 4.5 using distilled water instead of KCl. Looking at Buxbaum's "Cactus culture based on Biology", a *Zygocactus* - which is an epiphyte used to growing in very acid peat-like media, presumably on trees - was essentially either not growing or dead at pH 4.5. The very low acidity figures quoted by Huber for certain of the habitat soil samples which he tested seem to me to be so acidic that plants could not survive in that sort of soil. I would guess that most cacti prefer an acid soil but I would suggest that the pH should be in the 5.5 to 6.5 range. Of course pH is only one factor in the enormously complex chemical system that makes up soil or compost mediums in general. Those who insist on using wholly artificial means to try and remedy incorrect pH are, in my view, only going to get very ill plants.

It would also be interesting to have more details on the sampling procedure, such as the depth at which the sample was taken, the quantity, how it was stored after collection, etc. Looking at the numerous slides that have been shown of habitat locations it does seem to me that many sites are stony or gritty on the surface, but what is it like where the roots run? A small sample from the surface may give a misleading reading. Maybe it would be better to take several samples a short distance (say a metre) apart and average the results. This is to be preferred to taking several samples in a similar manner and mixing them together.

.....from H.Middleditch

The method which was adopted by Huber for the chemical analysis of the habitat soil samples may well have been used because he is a pharmaceutical chemist, trained to determine absolute values, and not a soil chemist, trained to distinguish between what H⁺ ions are available in the soil and those which can only become available after treating the soil with the appropriate chemical or fertiliser. The "fertiliser" may actually function to some extent by releasing chemicals locked up by other soil components rather than by feeding the crop directly; or by releasing locked-up H⁺ ions so that the lowered pH creates a soil environment in which the roots can take up necessary chemicals present in the soil but which is denied to the roots solely by a higher pH.

Now that almost all domestic water supplies in this country are on the alkaline side of neutral, it would appear to be almost a necessity to adopt some means of converting this to being on the acid side of neutral before using it in the greenhouse.

LOOKING AFTER UEBELMANNIAS - From D.Martine

Not long ago I became the lucky owner of an *U.pectinifera* and an *U.buiningii*. As I would be very sorry to lose them I would like to know how to take care of these two plants both in summer and in winter.

.....from A.W.Craig

My *Uebelmannias* are kept in a small greenhouse within my large greenhouse, where they have a minimum temperature of 57-60°F. They are potted into the same compost as all the rest of my plants. The pots are stood in a largish plastic tray so that they can be watered from below. They are allowed to go dry over winter, but not for a long period.

....from N.Tate

At present my *U.flavispina* is about 6 inches tall and 5 inches across, on its own roots; it has been in flower on and off between January and April. Hand pollination of the fully open flowers was attempted this year and as a result it has set fruit for the very first time. Now *U.pectinifera* is also in flower. My *U.buiningii* is hardly big enough to flower yet. They are all in fairly shallow pots as the roots are quite fine. The compost they are in is a mixture of loam and peat near the roots and a more gritty compost around this. They are sprayed at intervals in the course of the winter, when they are kept at a minimum of 58°F in a gas heated greenhouse. This has an air-circulating fan in operation - running fast during the day and slow at night. There are also automatic ventilators in the roof which will open on a sunny day from January onwards.

.....from R.Moreton

My own experience is that *U.pectinifera*, *pseudopectinifera*, and *crebispina* are relatively easy in cultivation, even on their own roots, certainly no more of a problem than the Brazilian *Melocactus*. But *U.meninensis* and *U.gummifera* are definitely for the experts only! These two are particularly difficult from seed. Temperature wise, I would suggest 10°C as a minimum, but other than that they are treated the same as the rest of my collection. My imported *U.pseudopectinifera* was acquired about 25 years ago and thereafter it flowered for a year. Although it has not flowered for many years it continues to grow and seems to be healthy.

.....from A.Hofacker

My own experience in growing *Uebelmannia* from seed is that the seed of *U.pectinifera* and its relatives germinates quite well, whilst the seeds of *U.meninensis* and its relatives germinates very poorly indeed. This observation has also been made by others here in Germany. So far we have no explanation for this.

.....from S.Ratcliffe

My large greenhouse (26 ft by 10 ft) has an internal dividing partition with a door so that the inner section can be run as a warm house. This is maintained at 47° minimum and this is where I keep my two *Uebelmannias* on their own roots, and other Brazilian genera. My compost is the same throughout my collection, approximately equal parts of peat, sharp 3mm granite, and silver sand. During the summer I water with a hose pipe and now use 'miracle gro' fertiliser at every watering, with an adaptor and dispenser on the

end of the hosepipe. During the winter very infrequent watering is given. Flowers are rare on *U.pectinifera* but *U.flavispina* flowers regularly, albeit spasmodically, every year. It even has four flowers open at the end of October!

A WARMING SUBJECT From H.Middleditch

Once upon a time, bills for gas told you how many cubic feet you had used and how many B.Th.U's you got from each cubic foot. Now that bills for both gas and electricity quote the cost per kilowatt-hour it becomes readily apparent that current charges are 7.67p per Kwh for electricity, compared with 1.47p per Kwh for gas. This provides a distinct inducement to consider gas heating as an alternative to an electric fan heater for maintaining an acceptable winter temperature in the greenhouse. For a gas heater to operate in the same way as an electric fan heater, it needs to be equipped with a pilot light and operate with a thermostat control. The only suitable heater of this type currently on offer from British Gas is a Sim Fairway of 4 kw rating, a little larger than I would have wished to use. One or two people have mentioned the name Shildon for greenhouse gas heaters but it was suggested that they had gone out of business.

.....from F.Wakefield

The Shildon business was taken over and this heater is now produced by a firm called Hotbox Heaters who are at Lympington, Hants.

.....further from H.Middleditch

This firm apparently offer a wide range of gas heaters from 0.75kW up to 4 kW On their price list, the Sim Fairway is £25 less (including delivery) than the price from British Gas.

.....from D.Angus

You could have got an even better bargain in the shape of a Thermal Tempest heater, made on Mere View Industrial Estate, Yaxley, Peterborough. To keep my own greenhouse above 50°F in winter, I purchased a 3.5 kw heater. Like the Sim Fairway, this has a built-in thermostat situated at the base of the heater where the air is drawn up by the heating flame. It does not operate on a pilot light, but the flame is cut down to a very low height indeed on idling. The latest model is made in stainless steel in place of a painted casing. It has proved very satisfactory for my purposes.

.....from F.Wakefield

You will probably find it advisable to make use of a plain fan so that it will disperse the plume of hot air rising from the heater throughout the greenhouse. One way in which this can be done is to mount an additional thermostat immediately above the hot air outlet on the gas heater and use this to control the fan. For this purpose I made use of a thermostat from an immersion heater, which is usually set at 180°F but with an adjustable setting this can be set right back to about 80°F. The advantages of this type of thermostat are that it is very robust and not very expensive. It does have quite a bit of thermal inertia but then this is hardly significant compared with the wide difference in temperature between the gas heater idling and in operation.

“BOOK REVIEWS”

CACTUS D'ARGENTINE - By J.G. Lambert - Review by J.Theunissen Translated by W.W.Atkinson from Succulenta 4;1995

In an exceptionally well presented book with leather cover, the writer takes us with him to Argentina to tell us about the plants growing there, both in habitat and in culture. He does not have the pretension to present all the species appearing there; he restricts himself to those he himself has found in his six journeys to and fro across Argentina, altogether nevertheless a good 270 species and varieties. He uses the Backeberg (alphabetical) system of presenting the genera and species. However the descriptions are not kept short as with Backeberg, but expounded in detail, sometimes accompanied by commentary, such as Ritter provided in his “Kakteen in Südamerika”.

In contrast to various books that have appeared in the last three years, Lambert does not follow the new classification of Hunt & Taylor, but stays mostly with the “old” system, so that it will be clearer to the interested amateur. In what is certainly not too difficult French, the writer frequently presents firstly the genus with its characteristics, followed by a description of the various species and varieties with their cultivation recommendations. The text is illustrated with no less than 212 colour photographs as well as 33 in black and white. The quality, especially of the colour photographs in habitat is very good. It is a pity that a few have not come out too sharp in the printing process. Personally I find the pictures of the plants in cultivation a little on the dark side. There are, additionally, ten photos of various landscapes in Argentina, so that even the stay-at-home readers can get an idea of the conditions in which the author did his plant hunting.

Special attention is put on the genera *Gymnocalycium* and *Parodia*, which are mainly native to Argentina. The attraction of both genera is demonstrated with superb colour pictures. The book ends with a summary of Lambert's Field Numbers, with details of locations. In spite of the excellent presentation, I find it a mistake that nowhere in the book appears a map of the area. This would at least have helped the reader to localise the ten characteristic biotypes, and one would also understand the areas where the various genera grew.

All in all, we have here a book that certainly is not cheap, but against that it is a fine survey of the cactus flora of a large part of South America. Certainly I know of no book on *Gymnocalycium* and *Parodia* that

contains so much (not French) illustrative material.
For *Parodia* and *Gymnocalycium* enthusiasts - a must.

CACTACEAS EN LA FLORA SILVESTRE DE CHILE By A.Hoffmann - Review by J.Theunissen
Translated by W.W.Atkinson from *Succulenta* 3.1995

It is a known fact that books about cacti are published in Germany and England because interest in these plants is greatest in those countries. That one appears in Spanish, and also by a south american author, might be seen as a novelty. Actually we miss out on the input and local knowledge that can tell us something about the cactus flora of south america.

Adriana Hoffmann is not unknown to the better-read cactus amateur and has other publications in her name. I first saw her latest work, an exhaustive treatment of the cactus flora of Chile, at a friend's in Beieren and I was immediately taken with the publication. It took rather a lot of trouble to get hold of one of the 5000 copies printed, but I was lucky. For me the book has a total freshness of approach like no other that I know. The book contains 88 water colours of cacti appearing in Chile, each the artwork of Andres Jullian. Next to an illustration of the solitary form is often a reduced reproduction of the relative clumping growth and sometimes a flower section, fruit and/or areole form. Often the conditions of the habitat are shown in black and white sketches. The water colours are often difficult to distinguish from colour photos. The author uses the new classification of Hunt and Taylor. A complete Latin description is quoted as well as indications as to where in the literature illustrations are to be found, then followed by a detailed description of the species. Separately is a key to the various varieties and details of the complex of plants most nearly related. For each species is noted whether or not a survival danger exists

After a general introduction there follows a chapter on the family Cactaceae including notes on the various root and stem formations. In this chapter the other plant parts are also noted. We are introduced to the evolution of cacti using the system of Prof. Barthlott. Attention is also given to the ecology of cacti, clearing up some misunderstandings. The author divides her country into 12 regions which each has its special conditions. A short chapter is given to practical uses of these plants. A summary of the history of cactus study concludes with a summary of the specialised cactus publications and details of some botanical gardens.

After this somewhat general introduction, the book goes on to study the cacti in Chile and concludes that cacti are a plant group in danger of dying out. Before going on to a key to the Chilean cacti there is a very detailed list of botanical terms which appear regularly in the following part. After a comprehensive bibliography with no less than 86 titles follows in conclusion a list of genera accepted by the I.o.S working group, a summary of illustrations in the book, and an index of the local Chilean names and a list of pre-Taylor scientific names.

If you can get hold of this book, and price and language are no problem, it is certainly to be recommended, perhaps specially for branch libraries which have a broader usage basis.

GYMNOCALYCIUM - A COLLECTOR'S GUIDE. By J.Pilbeam Reviewed by G.J.Swales

Hardback, 191 pp., 200 x 280 mm., 124 colour photographs, 98 monochrome. Published 1995 by A.A.Balkema, P.O.Box 1675, Rotterdam, Netherlands. Price £45.

This is a handsomely produced volume dealing with a very popular cactus genus and one which has been my own favourite for nearly forty years. Over that long period of time, as far as I am aware, nothing comparable containing such a wealth of factual material and excellent colour illustrations has been published in the English language. Its arrival is therefore most welcome.

Chapters on Cultivation; Classification; Seed, fruit, flowers and spines; Geography and Distribution, plus lists of recognised species and collectors' numbers accompany the bulk of the text, which lists and describes the species in alphabetical order. Also included under each species heading are varieties, references to the relevant literature, habitat locations, collectors' numbers and the classification of the plant according to both Schutz and Buxbaum. A glossary dealing mainly with the meanings of species names derived from Latin and Greek words (though surprisingly omitting the generic name, whose meaning is naked calyx i.e.lacking wool or spines), a list of possible sources of seeds and plants, and a Bibliography, conclude the book.

When reading the eminently sensible advice on cultivation, I could not help but recall memories of the crushed brick and well-rotted cow manure of the early 1950's!

The chapter on Classification provides concise statements of the ideas of both Schutz and Buxbaum and the reader is left to make their own choice, which is as it should be. Those whose interests lie mainly with growing plants, however, should not skip these pages. Taxonomy for some becomes almost addictive, to the exclusion of all else, but a working knowledge of one or the other of these schemes can be a very useful tool in the identification of unlabelled bargains from the local garden centres, or perhaps more often, wrongly labelled plants!

The use of seed, fruit, flower and spine characteristics in identification are then briefly touched upon. Unfortunately the SEM photographs of the seed with which this chapter is illustrated fall far short of the standard now possible with modern equipment and must be criticised for not portraying each specimen from exactly the same angle. This is essential if valid comparisons are to be made between one seed group and another. A hilum view of each would also have been very informative.

Geography and Distribution is dealt with in a chapter contributed by D.Metzing, whose name will be very familiar to any *Gymnocalycium* enthusiast. There is a wealth of useful information here. Once again I must exhort the practical growers not to pass this chapter by. Even if you have no hope or inclination to visit south

america, the factual material here is extremely relevant to practical matters like watering routines, composts, and degrees of shading in the greenhouse. While welcoming the inclusion of distribution maps, inclusion of the names of the states and countries on all, not just the first one, would have made reference much easier, while the placing of the Biogeographic regions (Map 3) on the page opposite to the Geographical map of south america (Map 1) would have facilitated visual cross-referencing.

For many readers, the most important part of the book is the Commentary on species. Some monographic works tend to read like a telephone directory and are about as stimulating. This book certainly cannot be criticised on this basis - it is most certainly user-friendly. In it there is a vast amount of extremely useful information gathered from a wide variety of sources, many not easily accessible and often in foreign languages. This makes it an extremely useful reference book for both "beginners" and "experts" alike. However, if the beginner wishes to progress to the second status, then they will need to investigate further and make use of the references given under each species heading. Such references occur only in abbreviated form in the main text for obvious reasons of space. They should, however, have appeared in full in the extended Bibliography at the end of the book. Very few local public library staff, if any, when asked for "Pfeiffer, Abbild. u. Besch. Bluh. Cact. 2:Fig.1 (1845)" as an inter-library loan will do anything except turn very pale and plead that it is very near closing time!

Having been an amateur photographer for even longer than I have been growing cacti, I must record my appreciation for the uniformly excellent photographs in this book. Unfortunately, only too often, even today, floras are published with what I can only describe as "snapshot" illustrations that are a disgrace to author and publisher alike. In this volume, not only the originals, but also the reproduction of them, is first class, and it seems a pity that some of the colour photographs appear to have been viciously trimmed in order to fit them into what I can only call the "jigsaw" format of the colour pages. This format often does grave injustice to individual prints and I must confess that the little number grids on the facing pages infuriated me. Surely numbers could have appeared beneath the photographs themselves? The shots of the spination and rib arrangement of the plants lost a lot of their value by being in monochrome. I suspect that the originals were in colour and they should have been reproduced similarly. However, in fairness to the author and photographer, the blame probably lies with costs and technical problems rather than with them.

In summary, then, in spite of my retired schoolmasterly quibbles here and there, I think it an excellent book. I purchased my copy as soon as it became available and I certainly have no regrets. If you cannot persuade anybody to buy you a copy for birthday or Christmas, then go out January 1st and treat yourself!

Additional comments from J.Lambert

The various *Gymnocalycium* seed types are illustrated by macro-photographs, of which the one of the sub-genus *Trichoseminium* unfortunately fails to show clearly the typical excrescences on the testa. One may also regret the retention of *G.castellanosii* among the *Mazanensia*, and the absence of any picture of the quite striking *castellanosii* seed.

The crux of the book of course consists of the descriptions of the individual species, listed in alphabetical order. Each species is illustrated by a close-up view of the areoles and spines, which may help collectors to some extent, but which, in our opinion, could have advantageously been replaced by a top view of the plants, showing the crown and the general habit. In addition, the photographs selected are not always those most characteristic for the species concerned e.g. the picture of *G.schroederianum* shows some atypical 5-spined areoles, instead of the quite unique 7-spined "dragonfly" feature. Fortunately the B & W illustrations are complemented by 124 colour plates, which provide a much better view of most of the plants.

To sum up, certainly a useful reference book for the collector, and a handy tool to look up pieces of information which are otherwise dispersed amongst less readily available sources.

Additional comments from L.Bercht, Succulenta

Under each species name there is indicated the relevant literature, origin, and field numbers related to the species concerned. Although the reference to the field numbers appropriate to each species is well intentioned, there is a point of criticism here. As one example, in the Piltz field number list the name *G.stellatum* appears against P76 and P76a, b, and c. These numbers are indeed for the species mentioned. However, in the section of the book dealing with each species in turn, these field numbers appear with *G.riojense*. A still better example is *G.stuckertii*. The author holds the opinion that *G.stuckertii* falls within the relationship of *G.schickendantzii*. However, Kiesling takes the view that it is in the *Ovatisemineae* seed group and that these plants occur in the neighbourhood of San Luis city. The field numbers for *G.stuckertii* recorded by Papsch and myself refer to this plant in the Kiesling sense. The author himself contributes his own mite on *G.stuckertii*. The colour photograph is the relative of *G.schickendantzii*, whilst the black and white photograph shows the plant in the Kiesling sense.

.....from H.Middleditch

The prime aim of the author of this publication would appear to have been to provide a set of photographs and text as a handy guide to the identification of the various species within this genus and in this he succeeds reasonably well. Also included are brief references to the many varietal and similar names that litter the cactus literature, many ephemeral. The chapter on Geography and Distribution is accompanied by some ten maps which supposedly indicate the distribution area occupied by the various seed groups or sections of them. At the scale at which these maps are drawn, precision in indicating distribution is difficult; unfortunately the accuracy of the distribution displayed varies from acceptable to misleading. That the author invited D.Metzing to contribute the chapter on Geography and Distribution probably reflects not only the author's

acknowledgement that this was someone better qualified than he to write on this aspect, but quite probably the author's own disinterest in these matters. Hence his failure to check the presentation of the data on the maps. Similarly, under the heading of *G.denudatum*, the author notes that this species is found "from Rio Grande do Sul, through northern Uruguay, near Tacuarembó, Greuze, Cacapava do Sul, to Argentine province Misiones". It is very probable that the author extracted this from a text in German without realising that the "grenze" was the border, in this instance the border between Brazil and Uruguay. For those collectors who have little or no conveniently available reference data on *Gymnocalycium* distribution, this book provides a starting point but it is of doubtful value for those with a working knowledge of the distribution of the various species of *Gymnocalycium*.

THE GENUS FRAILEA By K.H. Prestle Reviewed by H.Middleditch

It was in 1991 that this same author produced a coverage of *Frailea* in two separate volumes which has now in 1997 been updated and expanded in a single volume of 250 pages. With few exceptions the text is in German. There are 20 pictures in colour and 60 in black and white of *Frailea*, together with four large detail photographs of a typical *Frailea* seed. Cost is 120 Dutch fl. plus post and packing.

In his forward the author records that he has travelled over 30,000 miles in the course of 7 trips to Uruguay and Rio Grande do Sul to study the cacti there in habitat. He also acknowledges the various friends who have provided data on the *Frailea* to be found in Argentine, Paraguay, and Bolivia. This is followed by a review of the history of the genus, starting with *Echinocactus pumilus* 1838. Then the geology and climate of Uruguay and Rio Grande do Sul is reviewed, including two colour maps showing the age and nature of the different bedrocks. One of these maps has a colour code on another page and there is no obvious legend for the second geological map. The body of the book, 200 pages, is occupied by a detail coverage of the genus, taking each species and variety in turn, arranged in sections in conformity with the author's conceptions. There is a generous number of names identified as "sp.nov Prestle" or as "subsp. nov. Prestle". There are a great many original descriptions and similar references reproduced from the literature so that this publication is probably the only available up-to-date reference in which all original descriptions of *Frailea* can be accessed. Therein lies its main value.

SOME LIGHT ON A DARK SUBJECT From W.Greenaway

At the present moment I do not have a greenhouse but I am raising various species from seed, including a selection of *Pilosocereus*. The propagator being used is a 30" by 16" with a 14" tall rigid transparent top, with a 50 watt heater in the base which is set to maintain 20°C. Natural daylight is effectively excluded and lighting is provided at night by a time clock, using a bank of ten 5 feet long fluorescent tubes, which total 600 watts. These are on for 15 hours at night only. The propagator runs at about 18°C to 22°C in the dark during the day and at about 23°C to 26°C when the lights are on. The compost which I use consists of a 50/50 mix of coarse silver sand plus Vermipeat compost with the coarse bits sieved out. The blurb says that the Vermipeat is a "blend of sphagnum moss and horticultural vermiculite with slow release nutrients". The coarse silver sand is sieved out of the commercial pea gravel which I use for embedding drainage pipes on the farm. The seed compost is not sterilised; it is soaked with tap water before sowing the seeds which are then covered with a little fine sand.

Blue algal growths can be a nuisance, even though I have put a sheet of dust-bin grade white plastic sheeting between the lights and the propagator, as I read that this tends to reduce blue-green algae. Now that many of the seedlings require to be growing on, they will still need to be raised by artificial light for a year. The question is, what sort of lighting would be most suitable for this purpose?

.....from D.Angus

My own seedlings are also raised indoors in a room which has no natural lighting, by means of artificial light and for this I use a single 400 watt metal halide lamp. These lamps are obtainable from Sunlight systems and their leaflets say that "Plants are most sensitive to blue and red light ... the metal halide lamp enhances wavelengths from red to UV, with an abundance of blue light" Control gear is required to operate the lamp, the lamp and the control gear together costing about £170. The bulbs last for about one year. Some time ago I read an article in which B.Lamb referred to this method of raising seedlings and he suggested that a 15 hour artificial day length was optimal, so I have my lighting on for about 12 to 14 hours every day. The light itself is about 22 inches above the compost level and naturally there is some fall off in lighting intensity towards the outside edge of the seed trays. To compensate for this the trays are edged with A4 glossy white card standing upright, which is intended to reflect stray light back on to the trays.

The seed trays are stood on a heated propagator but I find that I get quite acceptable germination without using this heating. The house itself will be at about 60°F in the daytime and there is quite a bit of heat from the lighting unit; a check with a thermometer suggests that the surface temperature of the seed trays will be about 80°F. The house temperature will fall at night time which is also when the light unit is switched off, so that the temperature of the seed trays will fall during the night, but this diurnal change of temperature may possibly be of some advantage. The seed trays each have a plastic cover, which do have a ventilator, but it is kept shut. A good quality plastic cover is essential, the cheap ones will discolour and go brown very quickly, from the effects of the light.

Because of the persistent trouble which I have had with sciara fly, my seed compost no longer contains any peat or loam. It is a mixture of chicken grit, pumice, and biosorb. A thin wick is cut from capillary

matting and laced through one of the drainage holes in the base of each one of the multi-pot trays, before filling with compost. The filled multi-pots are then stood in a tray sufficiently part-filled with water so the top of the compost becomes moist. Every month or so a half-litre of water is added to this tray. One tablet of Chinosol is added to each litre of this water. A ten-gallon flask is kept alongside the seed-raising unit, filled with boiled rainwater to which a drop or two of acid is added to bring it to pH 6.0; it only requires refilling twice a year. No real trouble is encountered with algal growth, apart from an occasional small spot.

TEPHROCACTUS - A GROWING SUCCESS From C.Holland

Early this year I was able to visit the collection of H-P.Thomas in Germany, whose collection is almost exclusively Tephrocactus. This is up in the north of Germany, near to the former east German border. In early April it was still snowing up there. Even so, his collection was looking superb, with many large clumps which had apparently been grown in a relatively short space of time from cuttings. Also the segment sizes of certain sorts were significantly larger than those which I have seen achieved in this country and, certainly in some cases, pretty close to dimensions observed in habitat. He seems also to be very adept with the floccosa sorts - again many large plants but even the smaller ones were producing long, thick stems. Whereas if mine start small, they stay small.

But most surprising of all were his various Tephrocacti sensu Kiesling (i.e. articulatus etc.) which were already producing new segments well in advance of any "Maihueniopsis" or "Cumulopuntia" species, whereas for me the Articulatus group are always the last to start growing, usually only once we are well into the summer. Again in this collection, contrary to my own experience, there were several relatively small plants of articulatus sorts of (say) round about half a dozen segments, but with largish segments, of some two inches or so in diameter. Some of his T.alexanderi especially stick in the mind, as I recall that one was coming into bud on a plant of only four segments!

His growing medium was very lava-rich compost which is available on the continent. Unlike the grit we use in this country, lava is porous. It seems to be very rich in available minerals and contains a wide range of particle sizes from 7-8 mm downwards, to fine or almost dusty, in similar proportions, so that it is light and free-draining. His plants were kept moist, but not soaked, from April to August. His greenhouse was glazed with twin-wall polycarbonate.

.....from H.Middleditch

How does this lava-rich compost compare with the material which is available in this country and which looks to me like crumbs of burnt clay?

.....from D.Angus

The material you have seen is called Biosorb, produced by Steetley. It is available in three graded sizes, the finest up to about one mm; the medium grade of 2 to 4 mm in size, and the coarse grade is up to 6 mm. It will certainly take up a lot of water, but it is rather expensive compared with the usual run of composts.

GOING FOR THE GRIT From R.K.Hughes

For compost for my plants and seeds I am now using 100% grit. At first I had thought of using broken brick, but this makes the pots very heavy for transport to a meeting or to a show, so I wanted some other sort of gritty material which I could add to the broken brick in order to cut down the weight. Although I had heard about Perlag I was under the impression that it was not available locally in a suitable form. Then I came across some broken lightweight aerated building blocks, which were just what I was looking for. Both these blocks and the softer type of brick are broken down to below about 3mm, then the finer particles under about 1 mm are sieved out; it is this finer grit which I use for seed sowing, without adding anything else to it at all.

All seeds are sown in 2 inch square pots, laid on the top of the surface of the grit; these pots are then put inside a 1 kg size of margarine container, which when empty will snugly hold nine 2 inch square pots. The centre part of the container lid is cut away round its square printed label and discarded, retaining only the tight-fitting rim of the lid. The seed compost is wetted with boiled water and then the container and its contents are sealed with a layer of cling-film over the container. This cling film is held securely in place with the lid of the container. Finally a piece of expanded polyurethane sheet is laid over the lid, in order to diffuse the light. The container is then put on a shelf right up at the top of the greenhouse, where it has the natural greenhouse temperature.

Much of my seed is sown in Spring, up to about May, but I also try sowing some in September. There is no heating in the greenhouse until the weather is really cold and frosty. Nevertheless I have had seed germinate between October and December. Once seed has germinated the pots are transferred to plastic trays with the usual propagator type cover and placed on a sunny windowsill in the house. Only then is any feed (Phostrogen) added to the water.

.....from H.Middleditch

From the point of view of water absorption there may be some similarity between the lava material, the Biosorb, and the broken lightweight building blocks.

PARODIA SPLENDENS - A MOVING SUBJECT from D.W.Whiteley

The comments on *Parodia splendens* in Chileans No.54 made no reference to the Knize field number lists. Having made a search of these lists I found that *P.splendens* appears twice; KK732 at Las Carreras at 2500m and KK 793 at Villa Abecia at 2600m.

.....from H.Middleditch

It now appears quite probable that the KK 793 from Villa Abecia and the RCB 325 from Villa Abecia may originate from the same location. Indeed one may even be tempted to wonder if the Knize material was received from Ramirez bros. Whoever did designate the collections from these two KK locations at 2500 and 2600m altitude as *P.splendens* may possibly have been guided (or misguided) by the altitude of 2500m quoted by Cardenas in his original description of this species (Chileans No.54 p.138), which would place it more or less on the floor of the valley of the Rio San Juan del Oro. This is a quite different environment to the locations at much higher altitude where Cardenas records his discovery of this species.

.....from M.Lowry

In Chileans 54 attention was drawn to the photograph Fig.209 which appears in the US C & S journal Vol.61 p.204, with plants in the foreground described by Lau as *Parodia splendens*. In the background are the two very distinctive peaks which we saw when climbing the road from San Pedro in the direction of Culpina. They are quite definitely the wrong way round in the picture in the US Jnl. which means that the Fig.209 must have been printed back to front.

.....from P.Down

There is a large mass of red rock about the size of the Malvern Hills in Worcester which is a very prominent feature to the west of San Pedro. We would be about half way between Cotagaita and the Cinti valley when we first saw in the far distance the peak of this rock standing a little way above the rest of the mountains to the east. The peak has a very distinctive shape and colour. At the same time there were places along the road here where we could look down into the very deep and steep sided valley below, in which the river was flowing, in the same direction as we were travelling. The nearer we came to the Cinti valley, the less we were able to see into the river valley below; but the road continued to run more or less through the top of the mountains, so that for most of the time we could see the prominent red rock coming steadily closer. We could see this very same lump of rock from the opposite side as we climbed up from San Pedro on the road to Culpina.

.....from H.Middleditch

At The Chileans 1997 Weekend, three or four slides were shown which had been taken by P.Down whilst travelling east towards the Cinti valley. These were taken at suitable viewpoints as the travellers moved eastwards, starting with the first sighting of these two prominent peaks on the horizon; and finally when they were much closer,. This was followed by a couple of slides taken on the ascent from San Pedro, when the same two prominent peaks could be clearly seen on the opposite side of the valley. The relevant Fig.204 in the Lau Cactus Log which appeared in the Vol.61 US Jnl., which had been put on to a slide, was then screened, as published. This slide was then removed from the projector, turned back to front, and replaced in the projector. This picture was then compared with a slide taken from what appeared to be virtually the same spot by the BDH party, the two views being as near identical as makes no matter. That there was no mistake about this was corroborated by five of our members present who had stood at this spot on different occasions and looked at that view. Thus it does appear that the Fig 204 in the Lau Cactus Log has indeed been printed back to front.

Errata No. 53

Page 88 - for Piate Grasse Vol11 read Piante Grasse Vol.11

Page 91 - for *C.poposoensis*, read *C. paposoensis*

Page 93 - for "about u60" read "about 60 Dutch guilders"

.....from J.Lambert

Under the heading of *Soehrensia korethroides*, on p.68, an inversion has occurred in my quotation. Actually it is the Abra de Potrerillo of which he altitude is 3900m, whilst the Abra de Pives culminates at 4070m.

INDEX - CHILEANS Nos. 31 to 51 inclusive

This index is arranged with the same three main sections as used in the ten year Index for Nos.1 to 30 inclusive, the subheadings (with few exceptions) also being the same as in the ten year index. This is intended to provide a convenient means of information retrieval for all Chileans issues up to No.51. Copies are available from our Membership Secretary costing £4.90 in the UK, £5.60 or \$14 overseas, all inclusive of postage and packing.

FIELD NUMBER LISTS

A Chileans Compendium of Field Number Lists was made available to members in 1992. A first supplement to this compendium was offered in 1993 and a second supplement to the same compendium was offered in 1994.

A subsequent scrutiny of these issues revealed various anomalies, such as the following. One and the same place name was not always spelt in a uniform manner, even within certain author's own field lists. Taking one detail, although not all maps are consistent, the mode of rendering the word "Villa" appears to be "Villa" in Spanish (Argentina), "Vila" in Portugese (Brazil), and "Villa" in Uruguay. Although the aim had been to adopt a common generic nomenclature throughout, various entries had not been converted to this

format. In addition, over the period covered by these issues the additions made to one author's field list included some entered as "Notocactus" when previous entries for the same taxon had been entered as "Wigginsia"; certain of these involved a change in species name. In addition there were plain spelling errors which had escaped proof reading.

Without making any additional entries, all these rectifications were made to both the 1992 compendium and supplements which were then offered as the 1995 Compendium. This was followed by a further supplement to the 1995 Compendium, in 1996. A further supplement is in preparation but is likely to be some months before it can be made available.

.....from P.Down

Among my seedling Parodias are some with an FK number which were said to have come from F.Kasinger. However, in the 1996 supplement which includes the Kasinger field number list, these are given a K prefix. Do you have any explanation for this?

....from H.Middleditch

When a request was made to F.Kasinger to include his field number list in our publications, it was pointed out at the same time that FK numbers of Fred Kattermann had been in circulation for an appreciable period of time. Together with his sanction for our use of his field list, F.Kasinger also stated that he had decided to change his prefix from FK to K.

CHILEANS 1998 WEEKEND

To be held 18-20th September at Nottingham University. As we go to press we hear from F.Vandenbroek he will join us on this occasion. Further details are available on request.

REPORT AND ACCOUNTS, CHILEANS VOL.16 NOS.52-54 INCLUSIVE

Receipts	£	Expenditure	£
Subscriptions	2810.55	Printing of journals etc.	1918.72
Back number sales	1303.46	Postage, stationery etc.	2116.90
Sales of other publications	535.30	Photocopier maintenance	115.15
Sales of plants	431.62		4150.77
	5080.93		
Miscellaneous income	112.91		
Bank interest	420.30		
	5614.14		
3 Chileans' annual weekends	8814.55	Nottingham University charges	
Balance brought forward		for 3 Chileans' Weekends	7603.07
from previous accounts	3832.06	Balance carried forward	6506.91
	18,260.75		18,260.75

Compared with the previous Volume, the change of printers (and use of a different reproduction process) is reflected in a reduction in printing costs. The increased sales of back numbers, indices and compendia has resulted in valuable added income but also a proportional increase in postage and associated costs.

The Chileans' plant lists, produced by G.Charles, were again well received and sales of these seedlings yielded the total amount noted in the above accounts as a donation to the Chileans' funds.

At the Chileans' 1997 weekend the facilities provided fell distinctly short of expectations due to unfinished refurbishment work at Cavendish Hall. Our complaint about the situation was resolved in the form of a discount on the anticipated University charges; the disbursement of this reduction in charges is to be agreed individually with those members who attended that event. In consequence, the above accounts refer solely to the cash-in-hand position at the close of Volume 16, together with an apparently excessive imbalance between income and expenditure for the Chileans' Weekends, both aspects being liable to material adjustment in the future.

Once again, it is essential to acknowledge the valuable support provided by the many Chileans' members who contribute comments and observations, without which our journal would be greatly lacking in substance, and in particular those members who give considerable time and effort to the publishing of "The Chileans" and other compendia, as well as supplying back numbers.

Chileans Publications

The following publications are still currently available (subject to reprinting, where applicable):

Back Numbers, price per volume:	U.K.	Overseas	
Vol. 1 Nos. 1 - 9 inc.			
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Vol. 12 Nos. 40 - 42 inc.			
Vol. 13 Nos. 43 - 45 inc.			
Vol. 14 Nos. 46 - 48 inc.			
Vol. 15 Nos. 49 - 51 inc.			
Vol. 16 Nos. 52 - 54 inc.			
Map Compendium 1994			
1995 Field Number List Compendium			
This Compendium comprises:			
1992 Field Number List Compendium			
1993 1st Supplement to 1992 Field Number List Compendium			
1994 2nd Supplement to 1992 Field Number List Compendium			
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Index covering 31 to 51 inclusive.			

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Payment in Stirling can be made by Money Order, Postal Order, Eurocheque or Cheque drawn on a U.K. bank and made payable to "The Chileans".

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Particular interests

Austrocactus	A.Johnston, 11 Malvern Rd., Scunthorpe DN17 1EL
Cereanae	G.J.Charles, Briars Bank, Fosters Bridge, Ketton, Stamford PE9 3UU
Cleistocactus	T.Lavender, Kalanchoe, Market Place, Tetney DN36 5NN
Copiapoa	A.W.Craig, 32 Forest Lane, Kirklevington, Yarm TS15 9LY
Discocactus	R.Moreton, 91 Umberslade Rd., Selly Oak, Birmingham, B29 7SB
Echinopsis	M.Muse, 32 Fielding Rd., Birstall, Leicester, LE4 3AJ
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THE CHILEANS

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