

# THE CHILEANS '99

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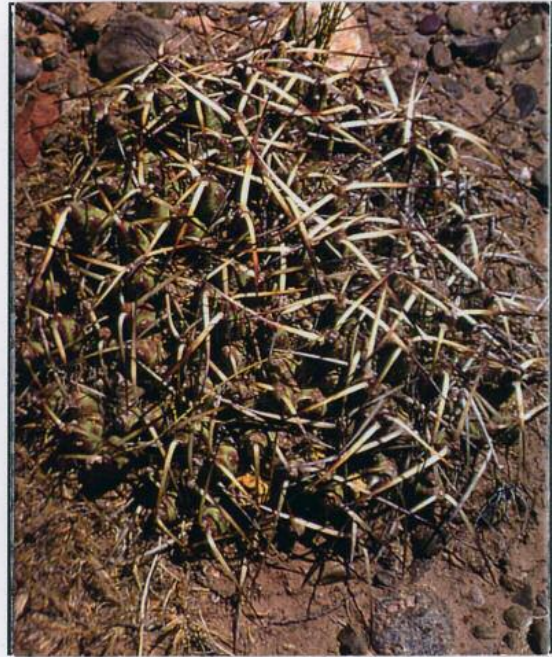
*Vatricania guentheri*  
La Higuera, Rio Grande  
Photo. - L.v..d.Hoeven





West of Iturbe

Photo: G.Charles



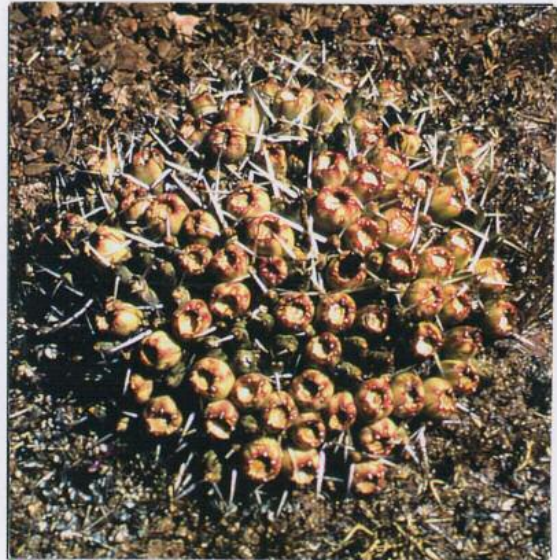
West of Abra Pampa

Photo: F.Vandenbroeck



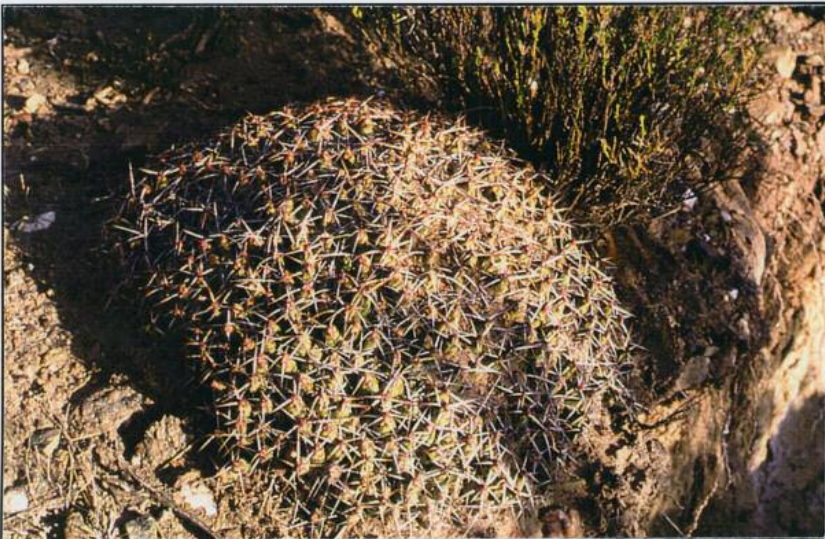
West of Iturbe

Photo: K.Gilmer



North of Tres Cruces

Photo: N.Wilbraham



Tephrocactus  
glomeratus

West of Abra Pampa

Photo: F.Vandenbroeck



## WE FIND TEPHROCACTUS HYPOGAEA From G.Charles

On our very first trip to Argentina in 1992 we had been able to include a visit to the Quebrada del Toro and also to the Quebrada Humahuaca. Late in 1995 we decided to pay a return visit to this part of Argentina, but on this occasion we intended to travel along the full length of the Quebrada del Toro and then continue out of the head of the valley and on to the Altiplano. The plan was to come back across the Altiplano to the north of Quebrada del Toro, aiming to join the Quebrada Humahuaca near Purmamarca.

After travelling up the full length of the Quebrada del Toro we crossed a pass at 4080m which took us through the mountain range which formed the watershed between the Toro valley and the altiplano; from there we went on towards San Antonio de los Cobres. We had made a number of stops in the Quebrada del Toro, at each one of which we found some interesting plants to look at. But once we had crossed the pass, there was nothing between the pass and San Antonio de los Cobres which caught our eye and induced us to make a stop. We then drove northwards out of San Antonio de los Cobres over a flat landscape, where the surroundings continued with little change in the scenery, with ground of an almost unbroken sandy or gritty brown colour. There was mostly little or nothing to be seen close to the road in the way of vegetation but sometimes a monotonous cover of low growing bushes or shrubs which would hardly reach knee height.

As we travelled north across this plateau we could see that we were gradually coming closer to a line of hills which jutted out northwards from the mountain range which formed the watershed between the altiplano and the northern side of the Quebrada del Toro. As we approached what appeared to be the margin of the Salinas Grandes, we could see that we were also reaching the end of the mountain spur on our right, which by now was perhaps only one km from our road. There were some tall *Trichocereus pasacana* readily visible on the crown of this elevation and it was felt that where they grew there might be some other, smaller, cacti.

At the spot where we stopped the car there was almost no vegetation but as we walked towards the mountain spur we came into an area of dwarf bushes which had characterised the almost imperceptibly sloping ground for as far as we could see along the front of the mountain slopes. These dwarf bushes were scattered a few paces from each other, so that it was only necessary to weave slightly to avoid them as we made a bee-line for our objective. These compact low bushes were not in leaf but seemed to be made up of a great many slender branches so that they were quite dense and looked to be almost solid. Between the bushes there were low growing herbs - probably of more than one sort - but they did not form anything at all like a continuous carpet on the sandy ground. We were still some way from the rocky ridge when I suddenly saw nearly under my feet a set of spreading spines forming a mat-like patch which was very roughly about the size of my hand. Having found this one specimen, which I took to be a *Tephrocactus*, then the ground was watched carefully as we walked forward to see if there were any more of these plants growing there. The scattered bushes, although quite low, hid any view of the ground beyond about three or four yards or so from where one was standing. So it was necessary to keep an eye on the ground all the time as we walked forward, looking for the tell-tale pattern of spines on the surface. It did take quite a while to find more of these plants and we did not find many of them. Once we had reached the rocky promontory where the *Trichocereus pasacana* were growing, there were no more of these *Tephrocactus* to be seen. On the rocky promontory, however, we did see *Tephrocactus bolivianus*, which had not been in evidence as we crossed the nearly level ground.

Travelling on from that stopping place, we then went further over the plateau in the direction of Purmamarca. This brought us to the foot of the mountain range forming the eastern margin of the altiplano, with the Quebrada Humahuaca on the other side of the range. We made another stop here to look at the *Pyrrhocactus umadeave*, which had been shown to us by the visiting speaker to an earlier Chileans' Weekend. Here we were still on gently sloping sandy ground with the same scattered low bushes so typical of the altiplano - and here again we found the same sort of *Tephrocactus* that we had seen at our previous stop, growing in a similar manner in similar surroundings.

After crossing the pass we came into the Quebrada Humahuaca, where we turned to go north. Beyond Iturbe the valley had become more of a plateau as we gradually climbed closer to the altitude of the altiplano again. Eventually we arrived at La Quiaca on the border with Bolivia. From here we went eastwards, still travelling on the high plateau until we were near Yavi. Here again we found the self-same *Tephrocactus*, but at this location it was growing on rather more sloping ground, which was somewhat more stony with scattered slabs of rock on the ground here and there. On our subsequent return trip south, we stopped near Iturbe and again found this same *Tephrocactus*, growing in a broad and level part of the valley.

Nowhere were these plants to be seen with a diameter of more than 6 or 7 inches across, a great many of them being of smaller size than that. They were mostly not what I would call hummocks, in the manner of *Tephrocactus bolivianus*, but more of a mat, or a very low cushion. At GC 180 to the west of Iturbe, at 11,200 ft altitude, we dug up one of these plants which was less than 4 inches across and had no more than a score of segments. It had a thick post root a good 8 inches long and about one inch thick, although even then we could not get right down to the very bottom of the root, so the very lowermost part had to be left in the ground. The post root was joined to the aerial segments by about a 40 to 50 mm length of what looked at first sight to be a narrow neck which branched in two at half length; but on close examination, this neck appeared to be grooved circumferentially at intervals, so it probably represented the oldest and original seedling segments which over the years had become gradually drawn down below the surface of the ground.

We detached three fairly slender segments from another plant and laid them down side by side on the ground in order to photograph them off the plant. These segments were certainly less than one inch long, probably 20mm or so in length, and 6 to 8 mm thick. On some plants at this location we did see segments which appeared to be of this same length but somewhat stouter, perhaps 10 or even 12 mm thick. Almost without exception there were spines only on the uppermost 3 or 4 areoles, sometimes on only the two topmost

areoles, on each segment. Rarely was there more than one spine per areole. The spines were sword shaped, flat, of a dark brown (or nearly black) colour at the tip and pale grey or whitish near the base. Some spines had only a short pale length at the base with the remainder of the length dark coloured, others had a short dark length at the tip, most of the length being white or grey - and all variations in between. These spines were usually as long as, or longer than, the length of the segments - between 20-40 mm long. The uppermost spines were often so broad at the base they were almost half the thickness of the segment at the point where they emerged from the areole. The very new spines were dark brown in the upper half but an orange-brown colour towards the base; they tended stand out away from the plant, but the older spines adopted a less upright attitude. On the three segments which we removed from the plant, the spines stood out at about 45° to the long axis of the segment. On many plants the spines projected sideways from the segments so that they tended to follow the contour of the low cushion of the plant itself.

Many of the plants we saw were in flower, but with only two or three open flowers on each plant. All the flowers were of a similar greenish-yellow colour. We did not see any fruit, as we were probably there at the flowering period and fruit would be more likely to be seen a month or two later. I do not recollect seeing any of the previous years' dried up fruit on any of these plants.

After we had returned home it was suggested by H.Middleditch that these plants might be those described by Werdermann as *Opuntia hypogaea*. It was many months later that I looked at the picture of the plant which accompanied Werdermann's commentary on this plant in the 1932 *Monatsschrift der Deutscher Kakteen Gesellschaft* and I immediately said to myself that it was the same plant that we had seen in the foregoing habitats on this trip.

.....from J.Iliff

On the occasion of the I.o.S. meeting in Salta we made an excursion to the north, following the Quebrada Humahuaca. Near the high pass to the south of Abra Pampa we disembarked from the bus but we only had a stop of 20 minutes, so we had to make the best of what was there. At the time we were told the name of the pass was Abra Azul Pampa but this name does not appear in any map or gazetteer. The site was a level plateau and I think it was pretty bare - it is worth stressing how comparatively sparse the cacti were. There were plants of *Opuntia glomeratus* there - perhaps some 50 to 100 yards apart from each other. These plants tend (and I stress "tend") to have reflexed spines often pointing at a slightly downward angle. This spine formation occurs on certain biotypes, of which the Abra Pampa was one. Whether these biotypes are consistent enough to deserve a varietal name, I am not really sure. Certainly there are other forms which have more erect spines.

.....from R.Mottram

A number of small plants of various *Opuntia* were received in 1992 from J.Iliff. These plants have continued to be grown in a compact form so that only very occasionally can a segment be removed for propagation. These included two plants identified as *O. glomerata*, JI 374 and JI 423. The JI 374 was collected by R.Kiesling at Abra de Pives, Purmamarca, at 4000m in November 1984 and sent to J.Iliff the same month. The JI 423 is a propagation from a plant collected by J.Iliff 10 km S. of Abra Pampa at 3400m, in April 1986.

.....from H.Middleditch

A segment from each of the foregoing plants measures barely 20mm long and some 7 or 8mm thick, displaying a pointed, rather elongated ovate form; there is a single spine from the areoles in the upper part of the segment, some 10-12 mm long, flattened, sword-shape, white for over half its length shading to dark red at the tip, projecting horizontally from the segment. Both these plants closely resemble the plants seen and photographed in northern Argentina by our own members which would appear to match the description of *Opuntia hypogaea* Werd.

.....from K.Gilmer

We came across *Tephrocactus hypogaea* in Quebrada del Toro, shortly before reaching Santa Rosa de Tastil, at 3,000m altitude. But these plants did not grow near the road which runs along the length of the valley; they are only to be found by leaving the road and climbing up the side of the valley. And even then there are not many plants, but only the occasional specimen. We then found these plants once more after crossing the divide at the head of the valley, on the edge of the altiplano at 4000m. All these plants had sword-shaped spines, spreading sideways, white with a tinge of brown at the tip, generally resembling the plant illustrated in the 1932 article describing this species which appeared in the *German Cactus Journal*.

A few days later we came across the same species a few km to the south of Iturbe, which differed from the plants seen in the Quebrada del Toro; the spines were not as broad and also almost completely black (not just the tips of the spines) but they stood upright from the segment. At the same location there were other plants with spines mostly grey and only a darker tip but again the spines stood almost upright from the segment. About 10 km west of Iturbe, along the road going in the direction of La Quiaca, we found other plants with spines of yellow colour, standing straight upright from the segment, but of about twice the length of the spines seen previously on this species. Thus it appears that the spination on this species is very variable, even if all the plants at any one location are fairly similar to each other.

The great majority of these plants which we saw in northern Argentina corresponded well to the maximum size mentioned by G.Charles. Occasionally however we did see a larger clump, such as those near Los Patos, on the road out of the Quebrada del Toro, going towards San Antonio de Los Cobres, where they were up to 45 cm across.

As to the colour of the flowers, we saw them in different tones of yellow: greenish yellow, bright yellow, lemon yellow, orange yellow, and even some orange. The same also applies to the ripe fruit which also were of a range of colours - and they also varied in form: spherical, ovate shaped to reverse ovate shape.

.....from H.Middleditch

When Kiesling was on detachment to Kew and participated in our Chileans' Weekend, he showed to us a slide taken in northern Argentina of a hummock of *T.hypogaea*. This will be about 25 to 30 segments across; the segments are not packed so close as to be side by side, so that if the segments are 12 to 15 mm thick, this particular plant will be some ten to twelve inches across. This particular plant is carrying perhaps half a dozen open flowers. There appear to be some bees actually inside two or three of the open flowers.

.....from C.Pugh

Yes I distinctly remember seeing these fairly large black bees in the *Tephrocactus* flowers, looking as if they were lying on their sides inside the flower and pushing themselves round with their feet. Or even not moving at all, as if they were asleep. We also saw these self same bees in other flowers - in *Rebutia*, for example.

.....from K.Gilmer

We found these plants in flower at many places during our visits to Argentina. It would not be expected to see all the flowers on a plant open on the same day. Mostly there were 3 to 5 flowers open together on one of these plants, perhaps as many as 10 or 12 on one of the really large cushions. Consequently the flowering period for these plants must extend presumably over something like 4 to 6 weeks. We saw pollinating insects on these flowers repeatedly, at many places. Mostly they were bumblebees or solitary bees.

.....from K.Preston-Mafham

I did see a species of bee visiting the flowers of *Lobivia marsoneri* and *Opuntia corrugata*. But as far as one can see, the bees in the *Tephrocactus* flowers on the Kiesling picture have a rather larger body than the bees which I saw. When I was travelling back from Iruya to the Quebrada Humahuaca, I stopped to have a look at the *Tephrocactus glomeratus* which were out in flower not far from the top of the pass. These flowers were all a dull yellowish green colour and I was quite surprised to see them open as the weather was very dull - it was certainly not bee-flying weather and no bees were to be seen in these flowers.

.....from H.Middleditch

Generally the size attained by the hummocks or mats of *Tephrocactus hypogaea* would appear to range up to about 12 inches (30 cm) across. We do, however, have the observation by K.Gilmer (above) of clumps of a much larger size. Perhaps these are just the rare exceptions? However, we have seen a photograph taken by F.Vandenbroeck of a clump of this species, which really is almost hemispherical in shape, growing near Abra Pampa. From one side of the hummock to the other, it is possible to count nearly thirty segments, which are not standing hard up against each other, so if each segment is possibly 15 mm thick, then again we may have a hummock some 45 cm wide.

.....from F.Vandenbroeck

I remember having seen *Tephrocactus glomeratus* (*hypogaea*) at three localities: 1. North of Tres Cruces 2. West of Abra Pampa on the road running towards Cieneguillas past Laguna Pozuelos. and 3. near San Antonio de Los Cobres. At each of these three locations the plants formed large sized hummocks, about the size that *Tephrocactus pentlandii* or *Tephrocactus bolivianus* may reach i.e. up to 40-60 cm across. The plant in my picture is at least 60 cm across. Your understanding of the segment thickness (10 to 12 mm thick) seems to me to be rather underestimated; in reality they are 20 to 25 mm thick.

.....from H.Middleditch

The location for *T.glomeratus* mentioned by F.Vandenbroeck to the west of Abra Pampa is situated on the lower slopes of the Sierra Cochinocha, on the west or altiplano side of that range. The climate and nature of the terrain at this site will in all likelihood be comparable to the location mentioned by G.Charles (above) at the west side of the pass on the road to Purmamarca.

At the location where G.Charles describes first finding *T.hypogaea*, the ground is evidently made up of sandy material with no actual rock close to the surface. In those conditions these plants would be able to draw themselves down into the ground so that they became almost level with the surface of the ground. Where these plants grow in hummocks of roughly hemispherical shape, the ground may well be of a more rocky nature so that it is not really possible for the plant to draw itself down into the ground.

.....from K.Gilmer

There are probably a number of factors which determine if a plant will form a more or less hemispherical hummock, or will draw itself down into the ground. To some extent the growth form is dependant upon the nature of the ground, whether it is stony or sandy, as suggested above. It may also be controlled to some extent by the genetics of the individual clone. Neither the very low growing forms nor the hemispherical forms are confined to any one part of Argentina. But there are locations where most of the plants were of low growth, and other locations where most of the plants display hemispherical growth. Another factor is whether the ground is level, or steeply sloping. On a steep slope, the surface material can be eroded away by the rainfall both around and under the plant. Once this has been washed away, there is a space between the ground surface and the lowest part of the plant. New segments can then grow into this gap, so that over the passing years the plant can grow further and further downwards. On one occasion we saw a specimen on which the long post root had already been partially exposed to fresh air by this sort of erosion, so that the downward growth of the lower part of the plant had resulted in the plant as a whole displaying an almost spherical shape.

.....from H.Middleditch

In recent years there have clearly been a good number of reports of seeing this particular form of *Tephrocactus* in northern Argentina. It evidently grows as far south as the upper parts of the Qu. del Toro; here and more to the north it can occupy somewhat sloping ground, but it clearly also grows on the very slightly sloping ground which stretches for hundreds of kms along the margin of the altiplano. Many sightings of this species have been made over the area north of Tres Cruces towards the border with Bolivia. Here, the altiplano

continues to stretch into Bolivia for a considerable distance to the north of that border, which might suggest that this same *Tephrocactus* could also be expected to be found on the Bolivian side of that same border. However, very little travelling has been done by cactus enthusiasts in that particular part of Bolivia and up to the present time there have been no positive reports of this form of *Tephrocactus* from that area. This leaves us without any indication of the real finding location for the plants illustrated by Backeberg in his *Die Cactaceae* Fig 247 and Fig 249., which was stated to have originated from Cardenas - and presumably from Bolivia.

### **TEPHROCACTUS HYPOGAEA IN BOLIVIA From T.Marshall**

On our trip to Bolivia which commenced in December 1997 we started from La Paz, planning to go south over the altiplano. On a previous occasion the members of the party had travelled southwards over the altiplano from La Paz as far as Challapata and made a number of stops over that distance. Consequently on this trip we only made a few stops along that particular stretch, as it had also been fairly well reported by other travellers. Our immediate objective was to continue south from Challapata over the altiplano, as far as Uyuni, since there was little (if any) available information about the cacti to be found in this particular part of Bolivia. After spending the night at Rio Mulato we planned to set off early on the following morning and we were on our way to Uyuni by about 6 o'clock. The unsurfaced road took us through an area which was mostly sandy flats with very little sign of vegetation at all. Being mostly flat stretches with only gentle gradients over any mildly undulating terrain, we made good time. The sun was only just above the horizon when we met a change in the nature of our surroundings; the road was now going over almost solid rock, which we took to be an eroded lava flow. The road climbed a very easy slope up this rocky ground and when we saw what appeared to be a mound of *Tephrocactus*, we decided to stop and look round, each member of the party going off in a different direction. This was the first sign of any cacti we had seen since leaving Rio Mulatos and also the first really hilly terrain of any sort that we had come across so far that day. We were now some 6 km to the north of Chita.

Apart from the mounds of *Tephrocactus* there was almost a dearth of vegetation, with only a few thorny bushes of roughly knee height, scattered here and there over the rocky slope, together with only a few very occasional clusters of bushes. The over-riding impression was of bare stony ground made up of either solid rock, or of small boulders up to about a foot across, forming a gentle slope rising steadily away from the road. Scattered at odd places on these rocks we could see possibly one or two dozen mounds of *Tephrocactus*. These were perhaps only ten inches across and were somewhat wider than they were tall. They consisted of literally scores of small elongate segments which were packed fairly closely together, each segment being about 12 mm long and perhaps 5 mm thick, each segment with mostly just the one sword-shaped spine from each of the topmost three or four areoles. These spines stood out sideways from the segment so that they tended to follow the contour of the mound itself. On the plants which I saw there were no signs of buds, flowers, or fruit. It was suggested almost immediately by M.Lowry that we were looking at *Tephrocactus hypogaea*.

We also saw here a number of plants of what we agreed was *Tephrocactus bolivianus*, probably even fewer in number than the *T.hypogaea* and giving the impression of making a lower clump. We did not see any smaller mounds of *Tephrocactus* at this spot, but when looking up and along the rocky slope we could not see any change in the nature of either the bare ground or the sparse vegetation, so we did not spend time searching over a wider area. The mounds of the *T.hypogaea* were roughly the same size as much of the broken rocks, so it is possible that there could have been smaller plants growing where we could not see them. There did seem to be some sort of pattern to the distribution of the *T. hypogaea* at this site, as there were more plants growing in some areas than in others. This could be due to vegetative separation or to seed dispersal within a limited area.

Moving on from this stopping point we continued for a short way over this rocky ground and then down the south side slope of the rocky hillock. Here we found ourselves back once again in a sandy terrain which was mostly salt flats; the further south we went the more sand dunes we saw and getting nearer to Uyuni there was more and more places where loose sand had blown on to and over the road. There were no more *Tephrocacti* to be seen along this stretch, as far as Uyuni.

.....from M.Lowry

Our stop at BLMT 114 to the south of Rio Mulatos was a very stony site with only very sparse vegetation. We did see some *Tephrocactus bolivianus* at this spot, which gave the impression that they were barely surviving, rather than growing. They did not form hummocks, but consisted merely of an untidy collection of segments, looking very fragmented. The individual joints were fairly large, some 2 to 4 inches in length. In segment form and spination these plants were rather similar to the *Tephrocactus bolivianus* we had seen previously when travelling south from La Paz, where the plants were in better growth, frequently forming open clusters or straggly hummocks. In general terms the neat hummocks became fewer as we travelled south and the clumps became more straggly. At BLMT 114 these plants were probably at their limit of existence in regard to the harshness of their surroundings. Because we were far more interested in the *T.hypogaea*, we did not pay a great deal of attention to these *T.bolivianus*, but both sorts were anything but abundant at this location, from what we could see.

Of the *T.hypogaea* which I saw at this spot, amounting to possibly ten plants in all, the segments were closely packed together and formed hummocks of a foot wide at the very most, possibly somewhat less. One plant which was photographed was displaying both buds, open flowers, and fruit. Most of the fruit was a brownish yellow colour and roughly the same size as the flower buds that were about to open. It was not

obvious which of the fruit was ripe, possibly the fruit of a somewhat paler colour. One of these fruits was opened and found to contain solid, dark, seed, which was presumably ripe. A segment was taken off the plant and laid besides the fruit in order to photograph both together. The individual segments were quite small, under 20mm long and barely 8 mm wide, tapering to a pointed top, virtually without tubercles. When standing over the plants we were in no doubt that they were *Tephrocactus hypogaea*, despite their being so far from any previously reported locations.

There was no other sign of life at this spot, either insects, birds, or mammals, so it is a wonder that the flowers get pollinated or that anything ever removes the fruit from the plants - apart from passing travellers! And we saw very few of those.

.....from R.Kiesling, *Darwiniana* 25, 1984

[Under *Tephrocactus glomeratus* ] Other Type material studied ... Puna de Santa Catalina, Dept. Santa Catalina, 3650m; collected by F.Claren 16-17/1/1901.

.....from H.Middleditch

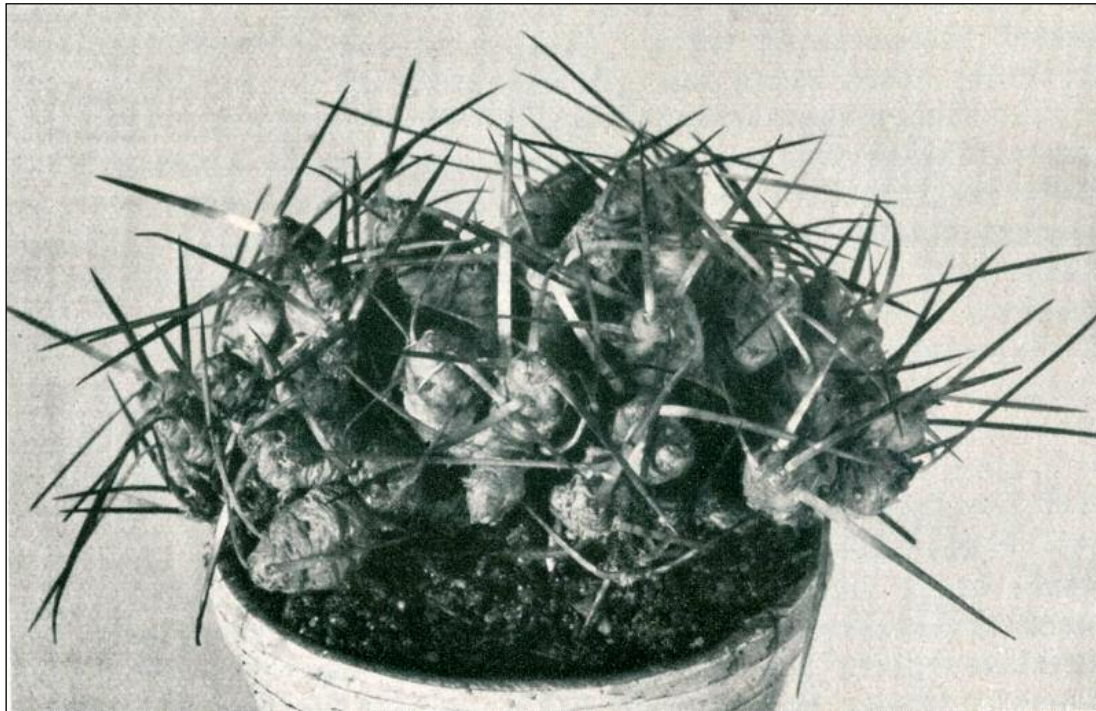
This location is in the very north-westernmost corner of Argentina, not far from the border with Bolivia.

There would not appear to have been any other subsequent reports of finding this species in this area, which is rarely visited by cactus enthusiasts.

.....from M.Lowry

On our trip to N.W. Argentina in 1999 we were able to reach Santa Catalina and to explore the surroundings. At about 2km to the west of Santa Catalina we did find *Tephrocactus glomeratus* on gently sloping ground.

### **OPUNTIA HYPOGAEA By E.Werdermann Neue Kakteen (C.Backeberg) 1931**



*Opuntia hypogaea*

Photo:  
E.Werdermann  
M.d.K.G.  
1932

Half-bushy, with long 3 cm thick tap root, even the short dividing branches still underground, almost only the terminal segments above ground and projecting no great distance above the surface. Individual plants ca. 5 to 15 cm diameter. Individual segments small, elongated egg-shape, at most 3 cm long and 1.5 cm thick, usually smaller. Individual segments standing slightly sideways one above the other, elongated egg-shaped, at the most 3 cm long and 1.5 cm thick, mostly smaller; segments somewhat tuberculate below the sparse areoles; areoles somewhat sunken, with yellowish wool-felt, and numerous pale yellow glochids about 4 mm long, only the uppermost 3 to 5 [areoles] with exclusively just one spine; spines up to 4 cm long, about 1 to 1.5 mm broad, completely flat. whitish yellow or brown at the base, dark brown towards the tip, often almost black or somewhat reddish, bent horizontal close above the areole, interweaving sideways with one another. Related to *O.atacamensis* Phil.

.....from H.Middleditch

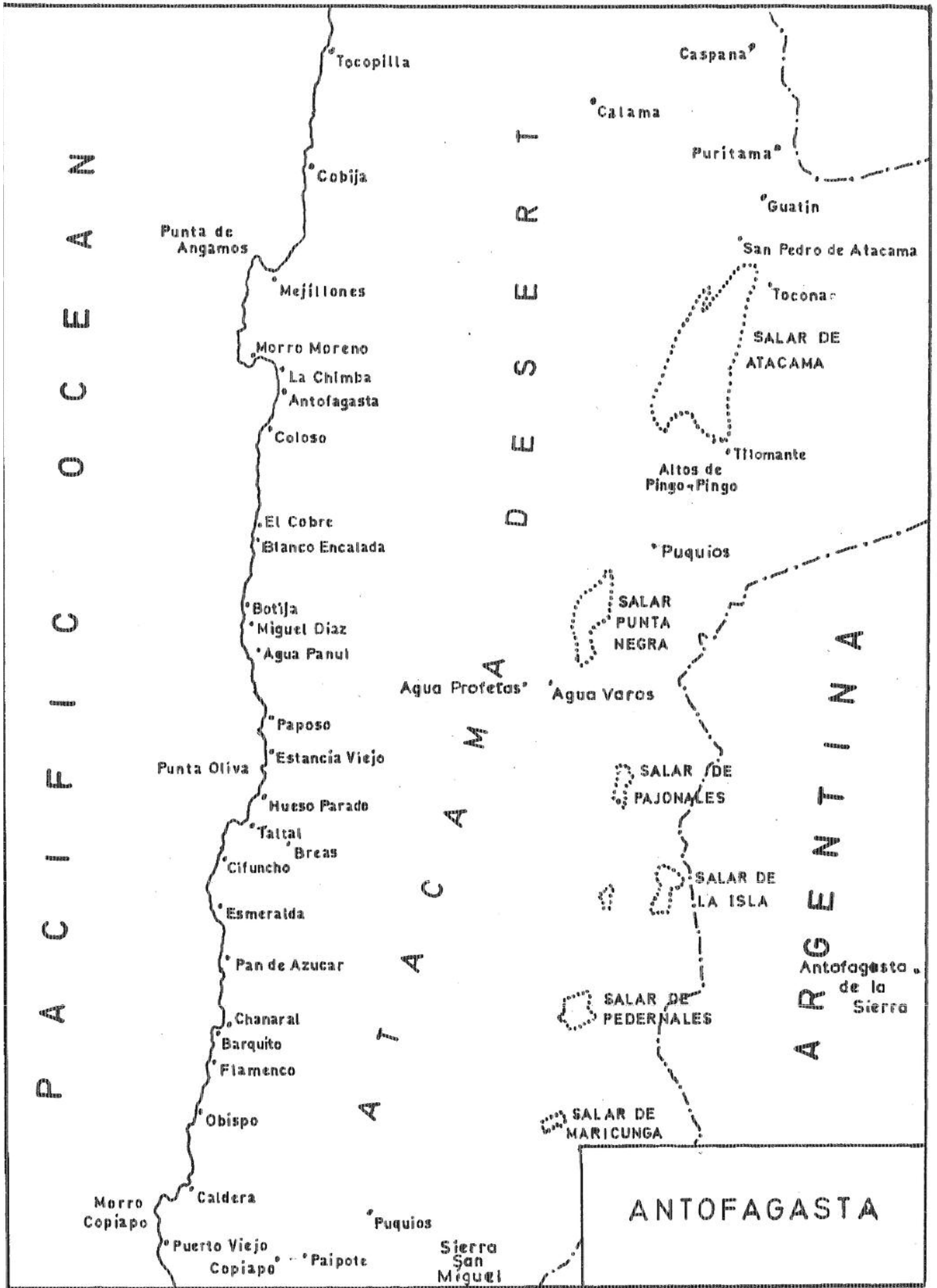
The segments growing not precisely one above the other but “etwas seitlich ubereinander” is of course a result of there being no growing point on a segment of a hummock forming *Tephrocactus*, the new segments arising from the uppermost areole or node of the older segment.

.....from E.Werdermann, *Monatsschrift der Deutschen Kakteen-Gessellschaft*, 3; 1932

*Opuntia hypogaea*. The species pictured here was discovered by E.Stuemer in the high Andes of northern Argentina, at around 3000 m altitude. The Botanic Garden Dahlem was presented with some plants by the firm of F.Haage & G.Klimpel, which I described for the first time in Backeberg “*Neue Kakteen*”.

The individual plants put down a strong post-root deep in the ground. Even the first dwarf, stocky







branches are concealed in the ground, thus still subterranean, as the name of the species signifies. The terminal segments stand closely packed together and form a flat stiffly spined cushion just above the surface of the ground. Typical for the species is the strong, flattened, yellow or red-brown single spines which arise from each areole near the apex of the segment and mostly bend horizontal closely above their point of attachment. Rarely are they accompanied by still one or more tiny spinelets.

.....from H.Middleditch

On the face of it, there is no clear explanation for the last remark made by Werdermann in his original description in *Neue Kakteen*, suggesting that his newly described *Opuntia hypogaea* is related to Philippi's *Opuntia atacamensis*. What might have led Werdermann to make such an observation.?

### **CONCERNING SOME CHILEAN CUSHION CACTI By E.Werdermann Notizbl. Bot. Gart. und Mus. 10.1929**

*Opuntia tarapacana* Phil. Catalogued as a plant collected from the high plateau of Antofagasta and Tarapaca. Part of the original is to be found in the Dahlem Herbarium, consisting of 2 segments and the half of a flower. Areoles spiny only at the top of the segment, furnished with only a little wool. Glochids, in so far as they occur, brownish and a few mm long. Spines 1-3, of which only one or two are strongly developed, up to 2 cm long, straight, brown, yellowish horn-coloured at the base, round. Flower on the whole about 3.5 cm long. Pericarpell almost naked in the lower part, at most with well separated areoles, with some more at the margin of the flower tube but not encircling it, with grubby short whitish-yellow wool, spineless or sometimes with 1-3 spinelets only a few mm long. Flower ... Fruit and seed unknown.

*Opuntia atacamensis* Phil. Chile: province Atacama, Dept. Copiapo, Sierra San Miguel, at about 3500m altitude, 5 November 1925. Portezuelo San Pedrito, southside just below summit on gravelly hillsides and benches -"Chuchumpi" - Ivan M.Johnston no.4869. Province Antofagasta, Dept. Taltal, Sierra de Varas, Aguada Varas, at about 350m altitude, February 1926. In level places, cushions extending to about 30-60 cm, already [flowers] withering, fruit green, fleshy. Occurring scattered and singly, nevertheless not scarce. E.Werdermann no.1050.

Both the foregoing herbarium specimens undoubtedly belong to the self-same species and correspond well with the of course very short description by Philippi, which was supplemented by Britton & Rose p.94 Fig.104 according to a cultivated specimen from Santiago. It is to be distinguished from other related species on account of the short thick woolly tufts in the areoles, especially on newer segments. These are yellowish or brownish bunches of glochids which are often still undeveloped on young areoles, sometimes already discarded in old age. Spines not much over 2 cm long, round, awl-like, horn yellow to black, tips usually darker, often somewhat frosted, up to 5 per areole, but unequally developed, often all standing straight out, occasionally 1-2, as the original diagnosis states, more or less adpressed.

Flower on the Johnston specimen 4 cm long. Exterior of the pericarpell and the flower tube furnished with insignificant yellow-woolly areoles, spineless, but with glochids. The upper margin of the pericarpell not bordered with spine-bearing areoles (as on *Opuntia rahmeri*). Scales on the areoles ca. 2-4 mm long, lanceolate, fleshy, gradually changing into outer flower petals. Flower, inner segments yellow .... Fruit fleshy, greenish, ca. 1.5 to 2 cm long, ca. 1.5 cm thick, furnished with sparse white woolly areoles with glochids. Seed somewhat kidney-shaped, 3.5 mm long by 3 mm broad.

.....from H.Middleditch

From this article we see that Werdermann had been on a collecting trip in Chile in 1926 and had evidently come across a population of *Tephrocactus* which he had identified as *Opuntia atacamensis*. His location at Agua Varas lies at no great distance to the southwest of the original Philippi Type location for *Opuntia atacamensis* at Pingo-Pingo, a consideration which may have influenced Werdermann's determination. However, it appears that when Werdermann came to described his *Opuntia hypogaea*, he must have been struck by a degree of similarity between that new species and the plants which he had seen in Chile in 1926 - and hence his final comment in his description of *Opuntia hypogaea* "related to *Opuntia atacamensis* Phil". The segment size quoted by Philippi for his *O.atacamensis* is certainly closely reminiscent of the segment size reported for many of the field sightings of *O.hypogaea*.

What exactly did Philippi have to tell us about his *Opuntia atacamensis*?

### **OPUNTIA ATACAMENSIS R.A.Philippi. Flora Atacamensis 1860**

*Opuntia* with ovate segments about 25 mm long, 18 mm thick, formed into a close-packed ball occasionally two feet in diameter and one foot high; areoles arranged in 5-7 rows from base to top, lower ones only covered with wool and very short bristle-like spines; upper ones displaying an upright spine 18-24mm long, pale yellow to reddish and 2-4 radials adpressed close together, only 2 mm long; flower pale yellow. Grows only in high parts of the central desert; seen near to Agua Profetas 9,000 feet above sea level 24°45' lat. and indeed rare there; then in Alto Pingo-Pingo at 10,800 feet a.s.l. at 23°40' lat.; but fairly frequently near to the head of the Puquios at 10,800 feet a.s.l at 23° 50' lat.

.....from H.Middleditch

These three places can also be located on the American Geographical Society one million scale map and do lie along the route taken by Philippi on his earlier visit to Atacama, more or less south by southwest from

Salar de Atacama. The Werdermann location of Agua Varas lies at no great distance to the southwest of the three locations given by Philippi (above) for *Opuntia atacamensis*, at a point just below the 3500m contour line. On this basis the altitude of 350m quoted above (by Werdermann) for this location may well be a misprint. The Port. San Pedrito location similarly lies just below the 3500m contour line, but at roughly 180 miles as the crow flies to the south of Agua Varas. The numerous sightings of this species made on the high plateau in northernmost Argentina are mostly at over 3000m altitude; even in the Quebrada del Toro, as indicated by K.Gilmer (above) *Opuntia hypogaea* is also found at similar altitudes, i.e. at over 3000m, well up on the sides of the valley. So that quite apart from Werdermann's comment based upon plant habit, both *Opuntia hypogaea* and *Opuntia atacamensis* appear to occupy a comparable phytogeographic niche in the high Andes.

So where does the other small segmented species mentioned by Werdermann in 1929, *O.tarapacana*, come from?

**OPUNTIA TARAPACANA By R.A.Philippi**  
**Anales del Museo Nacional de Chile, Second Section, Botanica 1891**

*Opuntia* somewhat caespitose; segments ovate, small, furnished at the tip with three straight white spines [?per areole - HM]; flower yellow with elongated ovary. Grows near to Calalaste.

Segments only 20 mm long, 10 mm thick; spines 12-15 mm long, becoming yellowish-brown at the tip, enclosed in white wool at the base. Ovary 20mm long, areole covered by short scale (leaf), furnished at the top with 5-6mm long white bristles; petals 21 mm long.

....from H.Middleditch

When reference was first made to this description of *Opuntia tarapacana*, very little information was available regarding many of the place names in South America, by comparison with the maps now in the possession of various Chileans' members. Consequently at that time the location of Calalaste was a mystery. The only clue was the specific epithet of tarapacana, which might suggest that this plant was found in Tarapaca, the very northernmost province of Chile, abutting on the border with Peru. When the very valuable map of Bolivia was received some twenty years or so ago from F.Brandt, which fortunately also covered province Tarapaca in Chile, that map was scoured for the name Calalaste but totally without success. However a travelogue which covered the discovery of *Opuntia tarapacana* eventually yielded the location of Calalaste.

....Journey to the Province of Tarapaca. By F.Philippi Verhandl. der Deutsch. Wiss. Ver. Santiago 1:1886 [Chileans No.38 p.150 took the party as far as Copiapo]. .... The last days of December were occupied with preparations for the journey. ... on 2 January we arrived at Puquios at the end of the railway line, from where we set off to Puerte de Paipote. On 3 January we reached Las Juntas, which is the main stopping place for carts which bring down the salt and borax from [Salar] Maricunga. On 4 January we set off for Maricunga ... At the Cuesta de los Chilenos the cart track climbed in numerous hairpins. ... We crossed an arm of the Maricunga lake, following the eastern side to the houses of Maricunga where we stopped the night. The lake is only partially covered with water on which were some flamingoes and other water birds. ... On 5 January we recrossed the same arm of the lake and rode to its north end, then going northeastwards to the Quebrada de Pastos Largos. ... On 7 January we set off for Leoncitos ... On 10 January we camped in sight of Laguna Brava, on a slope where there was neither pasturage nor water, but sufficient brushwood to keep ourselves warm. ... On 11 January we rode past Laguna Brava .. until we came to a high vegetationless plain, from where we could see the Peinado peak to the north. We then entered the Colorados valley where there was a stream and an abundance of water, pasturage and brushwood. ... On 12 January we crossed several valleys and on 14 January reached the Salar Lorohuasi. ... On 15 January we rode to the Diablo valley where we camped near some fine pasturage. The rain began to fall very strongly but fortunately it was of short duration. .. On the 16 January we reached the valley of Antofagasta and then stopped in Antofagasta de la Sierra for six days.

On 23 January we set off northwards for Atacama and around midday we reached the turn off for Mojones where there are some houses. We took the left turn, following a valley called Calalaste, setting up camp in the early afternoon so that we had time to collect some very interesting plants that day. On the next day we followed this valley northwards; the vegetation was relatively abundant and we collected some fascinating plants. We then climbed to a high point from where we saw the Salar Antofalla.

....from H.Middleditch

On the American Geographic Society 1:1,000,000 scale map which covers this area there is no difficulty in tracing the route taken by Philippi and party as presented in the foregoing account - starting from Copiapo, ascending to the altiplano and passing Salar Maricunga, then after several days travel reaching Antofagasta de la Sierra. The account then takes the party north from Antofagasta de la Sierra to Calalaste. The A.G.S. map marks the R.Calalaste to the north of Antofagasta de la Sierra and it also even locates Mojones on a tributary to the R.Calalaste. All the further place names mentioned in the account of the whole journey were similarly checked out on the map and nowhere else was there an indication of any place or feature titled Calalaste - quite a change for South American place names. It would therefore appear to be reasonable to suggest that the original collection of *Opuntia tarapacana* was from this location some km to the north of Antofagasta de la Sierra.

It is of no small interest to note that the segment size quoted for *O.tarapacana* is comparable with that recorded for *Opuntia atacamensis* and for *Opuntia hypogaea*. In addition, Calalaste lies a considerable distance to the south of the area round San Antonio de los Cobres from where *Opuntia hypogaea* has been recorded, the phytogeography being comparable at both locations.. Do we have any other record of a small-segmented Tephrocactus in the area between Calalaste and Sierra San Miguel?



But these are not the only reports of a small-segmented *Tephrocactus* from the general area of the Chile-Argentine border.

.....from R.Ferryman

From Copiapo we headed more or less east past the Salar Maricunga and Laguna Verde to cross the border between Chile and Argentina at the San Francisco pass, where posts simply mark each territory and relative distances to towns e.g. to Copiapo on the Chilean side. From there, a short journey west before the valley cutting across directs the road south, in the direction of Chaschuil. Some miles from that point we came across scattered hummocks of *Tephrocactus*, where I recollect a salt lake in the background. This was near a place called Las Cuetas at about 3700m altitude. There were *Tephrocactus* plants of various sizes, often forming fairly large hummocks and these plants had quite small segments. But there were other plants with similar segments which formed fairly small hummocks. There were also numerous clumps of grass, all a pace or two apart from each other, scattered in all directions. Going up to what I took to be one of these clumps it turned out to be not just grass alone, but a *Tephrocactus* clump with blades of grass growing up between and around the segments. The spines on the *Tephrocactus* were almost indistinguishable in colour and thickness from the individual blades of grass - perhaps an example of convergent evolution.

.....from H.Middleditch

These observations are no great distance from the Type locality of Philippi's *Opuntia tarapacana* at Calalaste. They are also getting closer to the usual accepted location for *Tephrocactus glomeratus* in San Juan and Mendoza provinces. It would appear that the first occasion on which *Opuntia hypogaea* Werd was placed into synonymy with *Opuntia glomerata* Haworth, was in Backeberg, *Die Cactaceae* Vol.I, 1958. However, there is no explanation in his *Die Cactaceae* why the apparently geographically interconnecting species of *T.atacamensis* and *T.tarapacana* are still treated separately by Backeberg. Most cultivated specimens of *T.glomeratus* bear segments which are materially larger than the sizes quoted for *O.hypogaea*, *O. atacamensis*, and *O. tarapacana*. and also display more than one spine per areole, unlike *O.hypogaea*. The justification for placing these two names into synonymy is consequently far from clear.

.....from J.R.Kirtley

Two of my smaller plants of *T.glomeratus* have been growing for some time in relatively small pots, out of doors. The segment size is nothing like as large as those commonly seen on cultivated plants of this species; all the segments are fairly similar, being roughly 20 mm long and about 10-12 mm in diameter.

.....from R.Kiesling

About the photographs which you sent to me, taken by various members in the course of their field trips. From the flat, triangular aplanate spines and the acute tip of the segments it is easy to name these as *T.glomeratus*. It grows at least from middle Bolivia to Mendoza in Argentina and also in Chile. There are several - indeed very many - different names because on account of the extensive area of distribution, different botanists or amateurs have described it under different names.

Another reason for the proliferation of names is the variation in the species itself. The shape of the cushions can be either globular or almost flat and they can also grow to a considerable size; for instance up to 20 cm high and an almost indeterminate horizontal breadth; not just to 50 cm across, but even 1 m or 2 m across! On my last trip to San Juan, in January, we found at some spots slopes with hundreds of specimens, of all sizes. On many occasions at high altitudes of around 3500-4000 m, but even at 4200 m in San Juan, there are individual plants which are for the most part dead, having living segments only round the borders of the plants. This is interpreted as an injury produced by the low temperatures resulting from the freezing of the water component at nights and the consequent expansion.

About the segment size - the average and normal is about 3 cm long, but there are specimens with segments of about 5 cm in length and at the other extreme of only 1 or 2 cm long. The latter specimens can be confused with *T.minutus*. The spines are also extremely variable not only in size, but also in colour. Typically the spine tip is coal-black, the central part white, and the base can be either black or white. The proportions of white and black change from plant to plant - you can see all variations between completely black to completely white. Of course, such plants look very different from one another. But this is not the only variation. Specimens can be found with honey coloured spines, or even with other colours. In Jujuy the areoles have only one big spine. In San Juan they have mainly one big spine and two very small lateral spines.

My recollection of the flower colour is always yellow, but I would accept if other colours have been observed. The fruits are green for a long time but become yellow when they are mature. This is typical, but I have also found plants with dull pink (brick coloured) fruits and shorter than normal. On one of my photographs the flowers are yellow when open, but the nearly closed flower is reddish - or coppery bronze. My impression is that the outer tepals are reddish, but the inner ones are yellow, as is frequent in several sorts of cacti. Of course *Parodia microsperma* flowers change from yellow to reddish as the flower becomes old. Also many people have come to me and said that they have found red flowers on *Trichocereus candicans*, but in fact what they have seen are closed flowers.

.....from G.Hole

When we were travelling from Tinogasta on the road to Chile, we came across plants of *T.glomeratus* which were at least as large as the 2 m across mentioned by R.Kiesling, On the ascent to Arrequentin, at one (and only at one) of the zig-zags in the road, we found plants of *T.glomeratus* which were this sort of size, but completely flat to the surface of the ground.

When travelling east from San Pedro de Atacama, we eventually came to the border between Chile and Argentina. About 2km on the Argentine side of the pass, we saw a few plants of *T.glomeratus*, but probably only ten in number, all told.

**WEINGARTIAS WITHOUT FLOWERS  
At The Chileans 1989 Weekend.**

**From K.Preston-Mafham.**

My own visit to Bolivia took place in December when I followed the road from Aiquile to the south which had been taken by L.v.d.Hoeven. Just beyond Puente Arce we saw some *Parodia ocampoii* in flower on steep cliffs above the Rio Chico. There were clumps of *Weingartia riograndense* here, too, which were not in flower. Then we found hundreds of clumps of *Parodia ocampoii* v. *compressa* growing in deep shade, with *Weingartia lanata* at the same place, but with not a trace of wool on any of them. On account of the low altitude here, the valley is nearly subtropical so the plants are probably cold tender.

The road leading towards Sucre winds up and out of the valley of the Rio Chico and comes into a zone of *Weingartia sucrensii* which are really quite abundant, growing on the most incredibly eroded steep slopes. It is a complete mystery how seedlings ever get established here. The site must be subject to severe insolation as there are no trees and precious few bushes to give shade. None of these *Weingartia* were either in bud or in fruit, there was only the odd old flower or two. We never did find any fruit on *Weingartia*. There was an *Echinopsis* growing here looking quite like *E.sucrensii* with very rounded ribs, a high rib count, and very elongated. The body was covered with a pale bloom, like that on the *Weingartias* at Lecori - you can also see this on the slides we have seen from L.v.d.Hoeven.

Later on, we left Sucre for Potosi and as we approached Millares, having seen no cacti for some miles, we came into a different type of vegetation. Here we found *Gymnocalycium millaresii* with ripe fruit; in the same area was *Weingartia pulquinensis* v. *platygona*, a smaller flowered *Weingartia*. This was the only *Weingartia* to be found in flower during the whole of this trip to Bolivia. There were thousands of *Weingartia* at this spot.

After spending a night in Potosi, we set off next morning for Camargo. This is a very rich road - at times there are thousands of cacti as far as the eye can see. It was raining most of the time we were travelling this stretch. We did not stop until we came down steeply into Cuchu Ingenio. Not far to the south of Cuchu Ingenio there was an amazing landscape, with thousands of *Lobivia lateritia*, *Parodia maassii*, and a *Weingartia*. Like all the other *Weingartia* we saw, there were no buds, no flowers, and no fruit. They may be *Weingartia vilcayensis*, described by Cardenas as a plant with spines so dense that the body is scarcely visible. This plant does not seem to have been recollected, despite the number of collectors who have travelled here. Looking through the spines on this *Weingartia*, you can see the bloom just like on the *Echinopsis* we saw earlier. Then we look at one of the *Parodia maassii*, which also has bloom on the body. But at other sites the *Parodia maassii* do not have this bloom. What causes the plants here to produce this body covering? None of these plants grown in cultivation produce any sign of this bloom at all.

Then it started to rain heavily again and we were obliged to wait at a river crossing for 14 hours until the water had gone down far enough for us to cross it. Interestingly, the temperature was in the 50's, the rain was pouring down, and yet a great many flowers were wide open. I cannot see any bees being active in that weather.

Continuing on our way we pass through a landscape with thousands and thousands of *Parodia maassii* and really big *Oreocereus celsianus*. From here on we saw whole landscapes dominated by *O.celsianus*. Then - quite close to where Cardenas says it comes from - was *Weingartia lecoriensis*, looking very much like *W.westii*. This year I saw the Type plant of *westii* and the *Weingartia* here were very similar to that. But these are now growing in a very different habitat to the *W.vilcayensis*, because they are growing in narrow cracks in the bedding planes of the rock, on the roadside. These plants are only 1.5 inches across, a typical size for *westii*, whereas I suspect that the so-called *lecoriensis* can be much bigger, depending upon where it is growing. So I also suspect that the densely-spined *W.vilcayensis* really are just *W.lecoriensis*.

.....from L.v.d.Hoeven (At The Chileans' 1989 Weekend)

My first trip to Bolivia was undertaken in January 1988, starting off in La Paz, from where we headed towards Cochabamba. Then from Epizana we turned south in the direction of Aiquile. On this stretch we saw *Weingartia multispina* and continued to travel south. As we approached the Rio Grande at Puente Arce we were down to about 1800m altitude when we came across *W.riograndense*, although they might possibly be *W.lanata*. There were flowers on the *Weingartias* here. To the south of the Rio Grande, we met with *W.sucrensii*. Later on, when we were well to the south of Pojo, we met with *Weingartia pulquinensis*.

.....from J.Pot

Now I have to disappoint you, for I saw no flowering *Weingartia* in the field during our visits to Bolivia.

.....from J.R.Kirtley

We did come across a few *Weingartia* in the course of the visit made to Bolivia in company with B.Bates in November 1989, firstly near Lecori, at about 3500m altitude, then on the climb out of San Pedro, and also near Chuquichuqui which is between Puente Arce and Sucre. I do have a photograph of a *Weingartia* with a solitary half-open flower which we saw near Lecori and I do believe that this was the only *Weingartia* flower that we saw during the whole of the trip. There were certainly a number of plants here with dead flower remains. We even saw one or two plants at Chuquichuqui which were in bud, some with buds from areoles half way down the body as well as at the shoulder. There were other plants carrying fruit and seeds - we found one plant with two buds and a fruit at one and the same areole. This site at Chuquichuqui was a rocky slope mostly formed of outcrops of reddish coloured rock covered in places with grit of the same colour eroded from the rock. There was no grass to be seen and no herbs or bushes, just the occasional tree which might have been 3 or 4 m tall. Some of the *Weingartia* here were offsetting, occasionally with a dozen or more offsets. The largest solitary plant we saw would be almost head size. Roughly one in every three of the plants here seemed



to have been uprooted and lay horizontally on the ground.

.....from M.Lowry

We came across several populations of *Weingartia* in the course of our trip to Bolivia in December 1996/January 1997. There was no evidence of flowers to be seen on the *Weingartia* which we saw at various locations, viz:- near Perez, near Aiquile, near Padcoyo (Lecori-Camargo), near San Pedro or near Las Carreras in the Cinti valley, near Culpina, nor at one stop near Cuchu Ingenio. At a stop at another spot near Cuchu Ingenio we saw just one plant with flowers; near Pulquina there were one or two plants with flowers; near Mataral there were many plants with flowers one or two days old. Near Chuqui-Chuqui (between Puente Arce and Sucre) there was one plant in flower and quite a few with ripe fruit, whilst of the *W.kargliana* on the Pampa Mochara there were many plants in flower and also some ripe fruit to be seen.

.....from K.Augustin

I can only corroborate the foregoing comments in regard to the flowering of *Weingartias* in their natural habitat, since I have never seen a complete ring of flowers on these plants. However, to judge by the flower remains that we saw, the *Weingartias* are nevertheless industrious flowerers. Possibly the flowers in most populations appear over a lengthy period of time, with only three or four flowers at any one time. In individual instances the following was observed:

In the area of Pulquina and the Rio Mizque: only sparse flowers and then no more than one or two on a plant - February, March, July. Near Aiquile, *W.multispina*: no flowers in July. Rio Chico - *W.riogandense*, *longigibba*, *lanata* - there are always only a few isolated flowers here; March, July and October. In the Sucre area - *W.sucrensis* and *neocummingii*; flowers only seen in October. But somewhat to the south of Sucre a fine form of *neocummingii* also flowers in March. In the area of Millares - *W.hediniana*, occasional flowers seen in March. At the many locations of *W.westii* and *W.cintinesis* visited in March, not one flower was observed. In regard to the flowering process of the cacti there, in particular of the *Weingartia*, one must nevertheless bear in mind that the microclimate and naturally the orientation and altitude of the habitat location is of significance. In addition it was also the case that the other cacti growing with the *Weingartia* also had only a few flowers, so that there is a possibility of an association with the pollinating agents in those places.

.....from J.Carr

On our brief tour in Bolivia in 1996 we found a few *Weingartia* at a site to the south-east of Cochabamba where they were growing with *Lobivia*, *Echinopsis*, and *Cleistocactus*, but there was no sign of flowers on these *Weingartia*. We also found a small population just before the cement factory at Sucre where they were growing in conjunction with *Parodia schwebsiana* and *Sulcorebutia canigueralli*. There was some evidence of flowering here but we were driven off the site by a thunderstorm so a thorough look was not possible.

To the east of Aiquile there was a large population of *Weingartia* and we stopped two or three times to look at these plants. There were some very small seedlings to be seen so there was regeneration. There were no other sorts of cacti in the immediate vicinity of the *Weingartias*, although *Trichocereus* and *Cleistocacti* were growing not too distant, perhaps half a km away. However owing to the nature of the terrain there could have been some growing much closer, even something nearby 10 metres high could have been hidden. This visit was late in the afternoon and there was evidence of flowering on most plants, although no open flowers. So plants here had obviously been flowering for a week or two, but no evidence of seed was seen. Even small plants had had 40 or 50 flowers and some buds were still evident. So for the plants at this site it would seem that the main flowering time is late September, with sporadic flowering after this time. This would be in keeping with the behaviour of *Weingartia* in cultivation. The size of the plants here varied along with the habitat; at places there were some plants 15 cm in diameter and 20 cm high, whilst other localities seemed only to have smaller plants with a maximum diameter of only 5 or 6 cm. I was not sure whether two forms existed or whether this was due to differences from one location to another, e.g. in soil or in age of the population.

From Sucre we went through Tarabuco and Presto to Valle Grande. Some 5 km beyond Valle Grande we saw some very long spined *Weingartia*, but again they were not in flower. Then when we were in Comarapa we were able to drive for about 4 miles to the north, after which we had a long and tiring uphill walk for about 5 or 6 km before we again found *Weingartia*, this time in flower and seed. Continuing further uphill, the *Weingartias* disappeared and we then met with *Sulcorebutia krahni* with its yellow flowers.

Our 1998 trip was timed to be three weeks earlier in the season, in the latter half of September. But again we saw very little in the way of flowers on *Weingartia*. What we did find however was many plants carrying fruit, sometimes with as many as 20 to 40 seed pods on one plant. But none of the seed we looked at seemed to be ripe. It could be ripe by the time the real rainy season starts.

.....from M.Lowry

My own recollection is that we never saw a complete ring of flowers, or even an almost complete ring, on any *Weingartia* when we were in Bolivia, even near Chuqui-Chuqui and on the Pampa Mochara where we came across the best show of flowers on any of the *Weingartia* that we saw.

.....from P.Bello

My own trip to Bolivia took me by plane to Sucre, from where my outings were made by public transport and on foot. This was in August and it never rained at all whilst I was in Bolivia. Only *Cleistocactus* was found in flower, although we did find a few yellow flowers on the *Weingartia trollii* we saw when going from Sucre to Quilla Quilla. The *Weingartia* in general begin to flower in the last week in August.

.....from F.Vandenbroeck

A *Weingartia* population which remains intriguing is the one to be found on the pass height between Cotagaita and Camargo. There is something strange about these *Weingartias*. It seems difficult to find out when they really flower. I saw them at three different periods: July-August, November-December, and

January-February. On these plants I never saw a single bud, flower, or fruit. At least on our trip to Bolivia in July-August, which is winter there, I found some specimens of *W. westii* near Lecori which were in flower. This is the dry period and the plants were very shrunken. We also found some *Weingartia* in flower on the climb from San Pedro along the road which goes to Culpina. These *Weingartia cintiensis* seem to be a scarce bloomer in November.

Further north we found several populations of *Weingartia pulquinensis* (or *neocumingii*) at different habitats. Near San Isidro this species grows on sandy level terraces together with huge specimens of *Gymnocalycium zegarrae*, *Cleistocactus parviflorus*, *Neocardenasia herzogiana* and *Echinopsis comarapana*. Between Mataral and Mairana it may be found amongst *Tillandsia*-laden trees and bushes, and *Neocardenasia herzogiana*, together with *Parodia mairanana*. Closer to Mairana we even found it growing on rocky ridges along the river while we were searching for *Hildewinteria aureispina*. They were flowering here in the middle of July. Between San Isidro and Comarapa we found *W. pulquinensis* on steep sandy slopes amongst bushes, trees, and *N. herzogiana* together with large numbers of *Parodia columnaris* and terrestrial bromeliads.

.....from H. Middleditch

At our 1998 Chileans' Weekend we were shown a slide taken near Lecori by F. Vandenbroeck of a *Weingartia* in flower, with just a couple of blooms. This picture was taken in the course of a trip to Bolivia undertaken in July/August, which is the middle of the dry season there. This particular *Weingartia* did look as though it was shrunken in upon itself to a very marked degree. In the middle of the dry season there is likely to be very few cacti in flower or in fruit, consequently it is hardly surprising that very few cactus travellers pick that time of year to visit habitat locations. One reason why there are so few reports of *Weingartia* being found in flower in habitat may well be that these plants flower and set fruit in the course of the latter part of the dry season.

## **WE FIND WEINGARTIA IN FLOWER AND FRUIT.**

**From T. Marshall**

On our 1998 visit to Bolivia in company with B. Bates, we were fortunate to come across *Weingartia* at various locations. Our trip started shortly after the middle of September so that in general terms the rainy season had barely started. When we drove out of Sucre to the south-west, we made a stop not far from the oil pipe-line. Here we found a population of *Weingartia* where there was very little to be seen in the way of flowers and certainly no fruit, indicating that their flowering period had barely started. Much further to the south, beyond Lecori, there were lots of *Weingartia* in fruit, but these appeared to be relatively fresh fruit and there were very few ants to be seen. We were able to collect a considerable quantity of seed at this spot. Further still to the south, between Quebrada Honda and Muyuquiri, the *Weingartia lecoriensis* appeared to be at the start of their flowering period; flowers were sparse and there was a small quantity of unripe fruit. However, there was also a few fruits still left from the previous season, and these yielded some seed. On the climb out of San Pedro on the road to Culpina, the *Weingartia cintiensis* also appeared to be just at the start of their flowering season.

From Padcoya we set off on the road which leads north-eastwards through the mountains towards the Rio Pilcomayo, travelling as far as Turuchipa. Here we found a population of *Weingartia* with a few withering flowers and most plants carried fairly fresh, unripe fruit.

From Sucre we also travelled to the east; from Tarabuco we struck off to the south east along the road which leads to Icla and just to the north of that place we found some *Weingartia longigibba*. We were really quite surprised to find them as we had not seen any along this length of road until we reached this one spot. There were no flower buds or flowers to be seen but plenty of fruit, which was fairly dry and ripe. This population probably had its flowering period perhaps two or three weeks before the time of our visit.

We made several stops a short distance before reaching Zudanez, near Quinquijana, and at two of these stops we found some *Weingartia riograndensis*. There were a few flowers to be seen but again nothing in the way of fruit, suggesting that these plants were just at the start of their flowering period, despite this being near the end of our trip. Then when we made a stop near Comarapa, we did find some *Weingartia* with plenty of flowers. There were distinct bands of rock of different natures at this location and the *Weingartia* grew in two separate bands. Between these two bands grew *Sulcorebutia krahnii* without any *Weingartia*, and no *Sulcorebutia* grew in company with the *Weingartia*. There were *Parodias* and orchids to be seen growing with the upper band of *Weingartia* but not with the lower band.

We did have the general impression that the *Weingartia* tended to flower at the very end of the dry season, setting fruit which ripened in the course of perhaps barely two or three weeks. The onset of the rains is probably not entirely uniform over this area of Bolivia comprising the basins of the River Pilcomayo and Rio Grande. Perhaps it is the odd early somewhat localised shower which fortuitously falls on some *Weingartia* and triggers them to start into flower.

.....from A. de Barmon

I do have a selection of various species of the northern group of *Weingartias* in my collection. these start to bud up in April and flowering goes on through the summer up to August. The fruit does ripen fairly quickly, taking some 4 to 8 weeks. Fresh seed will germinate easily.

.....from C. Garnham

In general terms I find germination of *Weingartia* seed obtained from commercial sources is pretty poor.

At a guess, I would say that success rates for me average no more than 5% germination, although mostly germination is nil with the occasional batch of 20-30 seeds producing 2-4 seedlings.



.....from H.Middleditch

The foregoing comments might suggest that the reproduction strategy adopted by the northern *Weingartia* is to flower towards the end of the dry season and ripen the fruit fairly quickly so that the seed has an opportunity to germinate at the onset of the rainy season. In this way the seedlings can become reasonably well established before they have to endure the subsequent dry season. It may also be possible that the seed germinates rapidly when fresh, but poorly when it is old.

.....from J.Cooke

I do have a few *Weingartias* in my collection and most of them flower readily. My *Weingartia trollii* KK 1594 produces a fairly complete ring of flowers, as does *W.culpinensis* and also *Weingartia* sp. Lau 958a. Lastly *W.pruinosa* v.*albispina* KK 1513 has carried a very complete ring of flowers. However, complete rings of flowers do not always form, nor do they always open at one time. All my *Weingartia* are grown on the top shelf under lightly shaded glass.

.....from M.Lowry

In my own collection the *Weingartias* flower in late May through June, i.e. starting just before the longest days. For the southern hemisphere this would probably be equivalent to just before the time we were in Bolivia. Of course there will not be much variation in day length in these latitudes, although what change there is may be enough to trigger flowering.

### **CINTIA FLOWERS AND SETS FRUIT From A.W.Craig**

I have a few plants of *Cintia* KK 1768 and KK 2052. On their own roots they are extremely slow growing; seedlings which are two to three years' old are barely 6 mm in diameter. Those on grafts grow a great deal more rapidly, just like any other grafted seedlings. In appearance the body might perhaps be described as half way between *Weingartia neumanniana* and a *Neowerdermannia*. Three years ago, one of the grafted plants put out a flower; it was quite astonishing how rapidly the buds developed into flowers. From first seeing definite signs of a bud it was only three to four days to the flower opening; if I had been told that bud to flower development was that fast and had not seen it happen with my own eyes I would have been very sceptical about it. The yellowish flowers seem to open only in the morning and open either for just the one occasion or again on the following morning. Then two years ago, two grafted plants produced flowers, fortunately close enough together to allow of cross-pollination, which did result in fruit being set. The fruit was quite small, hairless, with a few scales and so deeply sunken in the areole that it was not really possible to establish the size of the fruit, but it would hardly be more than four or five mm in diameter.

.....from J.Arnold

Each of my own three grafted plants of KK 1815 *Cintia subterraneus* have flowered, but unfortunately not at the same time so that I was unable to set fruit. It is indeed a very short time from the bud appearing to the flower opening, really only a matter of a day or two. Last year it was 6 May when the first *Cintia* flower opened. This year was a very cold Spring and many plants were up to a month later than usual in putting out flowers. When I looked at my *Cintia* on 6 May this year there was no sign at all of any bud, yet the flower was fully open on 9 May. I also have one seedling on its own roots but it was the single germination out of a packet of some twenty seeds

.....from J.Cook

Two or three years ago I purchased a couple of grafted KK *Cintia* at the Chileans' Weekend. They flower well each year but today, as I was doing a mealy bug hunt, I noticed seed pods on these plants! One was green, the other two were crumbling away. There were roughly 35 seeds per pod. They may be self-fertile, but I have not seen seed on these plants before and so far only three flowers out of some 15-20 have yielded a pod. They may have crossed with one another, courtesy the insects visiting the greenhouse; or they could be hybrids, possibly with a *Sulcorebutia*. Whatever way, I had no hand in the events! Half the seed will be sown this autumn and the other half will be sown in Spring.

.....from J.Kirtley

In 1993 I wrote to J.Donald to enquire if he might have any information about plants of the genus *Cintia*. His response was as follows: "This is an unpublished name created by Knize for plants found by Mario Arandia (M.A.P.) and sent as JD 325. There were 6 clones, but one died. Only JD 325/3 has been propagated. Since then, a recollection has been made by Arandia and sent to Knize under various names, including "*Lobivia arandiae*". It is not known if Arandia has found localities other than the one in Prov. Potosi, near Alti Lecori, where it grows in association with a *Digitorebutia* sp. and *Weingartia westii*. It can only be found when in flower as it grows buried in the grassy rocky ground.

"It could be a new genus, although I would prefer *Neowerdermannia* as *N.lecoriensis* nom. prov. It could be an aberrant *Parodia*, but the seed is wrong. The simple flower is buried in the areole and is *Neowerdermannia*. The seed, although different, points in that direction. It exists in three forms, monoecious and dioecious, so I do get seed."

Unfortunately there was no comment from J.Donald as to what happened to the seed. And what has now happened to these plants?

**CINTIA Knize & Riha - A NEW CACTUS FROM CENTRAL BOLIVIA By K.Knize & J.Riha**  
**Translated by G.R.Allcock from Kaktusy No.31 1995 No.2**

[Abstract] A monotypic genus of miniature cacti is described, coming from the province of Nor Cinti in Bolivia. It is named as *Cintia knizei* Riha after its discoverer K.Knize, who first found it in the year 1969, on upland plains at an altitude of about 4000m. *Cintia knizei* exhibits morphological features resembling the miniature *Copiapoa laui*, *Eriosyce laui*, and especially however *Neowerdermannia*. Further studies will render precise its relationships with the genera *Parodia*, *Weingartia*, *Neowerdermannia* and *Copiapoa*. Characteristic are the spineless areoles and the floral hypanthium, the dry and thin-walled fruits, and the smooth seeds without intercellular depressions on the testa.

In the year 1969 the first author travelled in the neighbourhood of the town Otavi in the province of Nor Cinti in Bolivia and collected mainly *Parodias* in the form circle of *P.maassii*. On the high-altitude plains, on the stony and virtually lifeless fields, my attention was taken by the clusters of taller *Oreocereus fossulatus* with splendidly spined *Parodias* at their feet. There also and for the first time I found the interesting small plant which is the subject of the accompanying description. The first specimen was in fact found by chance. On one of the uprooted *Parodias*, lodged among the long lower spines, which were already disintegrating and gradually disappearing below the level of the earth, there nestled an unfamiliar small cactus, almost devoid of spines or hairs, with a large subterranean part, and so tightly ensconced between the spines and the stones that I thought it might be an immature and stunted seedling or a lone stray plant of the genus *Sulcorebutia* or *Weingartia*. To be honest I did not pay too much attention to it at this juncture. There were not many of them and soon I lost them, or better said, for some years forgot them. The region where they grow is seldom visited, and indeed I myself only returned there some years later.

I also discovered another similar minute geophytic cactus in the neighbourhood of Lecori. To these I now paid more careful attention, and spent many hours between the two towns, namely Lecori and Otavi. This search resulted in the discovery of several populations. All were found in similar situations, always at an altitude of about 4000m above sea level, the highest being near Lecori at up to 4200m in a stony and empty desert, in a barren and windswept upland region. I distinguished two populations and allocated provisional names thus:

*Cintia napina* Otavi 4000m KK1768; and *Cintia subterranea* Lecori 4200m KK1815

The localities as yet known to me are very similar to each other. A high montane expanse formed of mild undulations of the terrain or even of small hills with piled up heaps of stones. Most often the new cacti are to be found on uniformly sloping or level stretches of the terrain. They always grow sunken in the stony earth, the finer components of which are largely covered by a surface layer of stones (desert pavement), and only deep down do we find a little clay earth, which joins the stones together, so that in times of dryness it becomes a very unyielding material. The amount of rainfall can only be guessed according to the vegetation present. Two other genera of cactus are represented, namely *Oreocereus* and *Parodia*, and rarely there appears also short and sparse grasses and low herbs of the sub-alpine andean zone. Low mosses and xerophytic lichens grow among the stones, and successfully withstand the dryness. Bushes and trees are entirely lacking. Rain falls in the period December to March i.e. in the southern summer, and its total amount over the whole year probably does not exceed 400mm. In the remaining months it rains for the most part not at all and, with the exception of the cacti, the vegetation dries up. During this period the *Cintias* severely dehydrate and shrink, so that the above-ground photosynthesis stem is withdrawn among the stones. Often it is entirely below the surface or deep between the stones, and not infrequently it becomes covered by a thin film of dust from the decomposition of the stones, so that maybe it is well protected against the burning sun. During the dry period the nightly dew and mists are by no means uncommon, but do not bring the plants any substantial amount of moisture, as is evidenced by the root systems. It consists of a meagre circular spindle and sparsely branching lateral rootlets, which grow out only from the lower part and proceed sideways and downward, with none going up towards the surface where they could await intermittent precipitations from dew and fog i.e. condensed water penetrating only a few mm below the ground surface. The root system indicates rather a specialisation for winning water from a lower soil horizon, as left in the substrate after heavier rains, downpours, and the like and then remaining for a longer time trapped between the stones.

The high altitude of the habitat affects also the temperature regime. The powerful daytime insolation imparts considerable energy and the surfaces of the ground and of the plants are intensely heated. The protective shade of the stones and the thermal inertia and heat conductivity of the rocky material are however effective in this respect. By the latter a large part of the heat is transferred to lower layers. Also the air movement is virtually unceasing. Strong winds persist for most of the day throughout the year and thus a large part of the incident solar energy is dissipated through convection, and that not only during the day, when the earth's surface is heated by the sun, but also during the night, when the heat stored under the surface in the rocky material provides warmth to the surface of the earth. Only rarely, then, notwithstanding the high altitude may we encounter there dew or hoar frost and the reason is indeed that the rock accumulates so much heat; thus even in the early morning, when the surface layers of the air have a somewhat diminished temperature, the cacti withdrawn into the earth are well protected against frost. The measured course of the temperature in similar upland parts of Bolivia is known to give a minima down to  $-7^{\circ}\text{C}$ , though it should be understood that this refers to momentary extremes, which are soon relieved as the temperature soars above zero. Frost thus persists only for a few hours, and is rapidly overcome by the strong heating effect of the sun. It is not therefore appropriate, except in unusual circumstances, to expect any frost damage in the natural habitat here in Bolivia, at the indicated elevations.

If from the mode of existence of *Cintia* we would try to anticipate resemblance to other cacti we would



obviously look towards *Sulcorebutia* and the high alpine species of the genus *Rebutia*. *Sulcorebutia* however derives mostly from lower situations; the highest confirmed habitat has been given as about 3600m altitude. Some populations of *Rebutia einsteinii* have however been found at the same altitude as *Cintia*, though these grow much further to the south. A comparison with the form-circle of *Weingartia westii* is very interesting. These grow in the same region, they are known near Lecori (*W.lecoriensis*) but occur at a substantially lower altitude, specifically at about 3000-3200m and differing therefore by about a thousand metres, which is such a difference, that also the conditions of life are tellingly dissimilar as between the two locations. Most significant is a comparison with *Neowerdermannia*. This peculiar genus of cactus inhabits an almost sufficiently conformable type of country i.e. an expansive terrain above the 4000m mark; up till now it has been found as high as 4500m, always in stony wastelands and drawn down deeply into the earth.

When we studied this interesting small cactus in the nineties we were led to the question, whether it is possible to assimilate it into already formulated classifications and to assign it as new species within some already-described genus. An interesting indication is the transversely extended areole deeply inserted between the roundly projecting tubercles. It is morphologically similar to the organ in *Weingartia* and *Neowerdermannia*. The floral structure is however peculiar and brings to mind *Copiapoa* e.g. *C.humilis*, etc. The fruits are small, naked, membranous and dry and most recall *Neowerdermannia*. The seeds are bent like bread rolls, with a shiny black testa again most recall *Copiapoa*. Thus the outcome of our discussions was such that, in consideration of the totality of distinguishing features, it is appropriate to separate *Cintia* as a small supraspecific taxon. The name was taken according to the origin of the plant - in the province of Nor Cinti in Bolivia. We do not rule out that further studies in the field and in the laboratory may indicate kinship relationships of this cactus to other taxa, and the future will undoubtedly bring a satisfactory ranking of this taxon within the recognised scheme.

The embryological development of this cactus recalls that within the genera *Parodia* and *Weingartia*. The cotyledons are much reduced. The spines on the first areoles are smooth and fine. Their number decreases as development proceeds and usually they are entirely missing by the time the plant attains a diameter of 1 cm. In the juvenile state the areoles are located on the tips of the podaria i.e. on the tips of the small humps, which are arranged into indistinctly defined ribs. With development and growth the small humps resolve into tubercles. In *Cintia* the chin-like tubercles enlarge to such an extent that the areoles become squashed and hidden between their bases. In maturity the areoles are thus hardly evident and on the surface of the plant one sees only bulging tubercles recessed around the areoles, from which recesses at the top of the plant there grows out a short cottony wool and the showy naked flowers.

.....from G.R.Allcock

The remainder of this article is devoted to the formalities of botanical publication and in regard to actual information adds only a few items of detail to the already extensive body of information presented informally in the above extract. There is a first description of the new genus in both latin and czech, and then similarly a description of the new species in both latin and czech, then after that yet a further discussion about the possible botanical or taxonomic placing of the plant.

Further information which can be gleaned from a study of this botanical part of the article includes the following:

Length of taproot 100-120 mm, thickness 20-30 cm. Green stem globular or flattened globular, of diameter 30-50 mm. Ribs 5-8, indistinct, rarely a little spiralled. Tubercles 7 mm long, 8 mm wide, 2-3 mm high. Epidermis brownish green, with coppery tints, pruinose, smooth, shining. Areoles 5 mm wide and 1 mm along the rib. Spines (of young juveniles) 3-6 mm long, glassy white, wool off-white. Spine count at most 5. Flowers wide funneliform (as in *Copiapoa*!), 30-40 mm diameter, coming singly but successively, opening about noon, closed at night, lasting about two days, yellow or yellow-orange. Fruit bare, spindle-shaped 6-8 mm by 3-5 mm, with a basal infertile part, smooth but sometimes with a few insignificant scales, only a little pulpy, soon drying and then membranous, becoming detached, greenish at first. Seeds semilunular (hence the mention of bread rolls!), black, smooth, shiny, 1.1 to 1.3 mm by 0.7 by 0.7 mm approximately, hilum sub-basal and not very pronounced, exterior cellular walls slightly convex at most, and intercellular depressions hardly to not at all evident. Known distribution limited to a small region between Lecori and Otavi, in isolated populations of a few individuals, sometimes in company with *Parodia maassii* and *Oreocereus fossulatus*.

While the flowers and seed suggest *Copiapoa*, the fruit and the large geographic separation argue against such an identification, as also does the absence on *Cintia* of Luthy's (1994) chemical response of the style. The stem morphology suggests *Weingartia* or *Neowerdermannia*, but the first of these is negated by the seeds and the second by the seeds and the flower. Allocations to any of these three would of necessity involve subjective preferences.

.....from H.Middleditch

The German Cactus Society Journal K.u.a.S for October 1996 also carried a translation of the article by Knize & Riha concerning *Cintia*. This included a photograph entitled "Habitat location of *Cintia knizei* near Sucre", the cement works which lie somewhat to the north of Sucre being visible in the picture. This is hardly "near" the reputed location for *Cintia* near Otavi. The text includes reference to the first discovery of *Cintia* in 1969 when Knize "was travelling in the vicinity of the town of Cinti [Stadt Cinti]". The old name for Camargo was Cinti, hence the designation Cinti valley; admittedly Cinti only lies some 40 miles as the crow flies from Otavi whereas the Sucre cement works are roughly 80 miles away. As has been indicated previously in these pages, not everything that can be read in the cactus literature is necessarily correct.

It is indicated by Knize & Riha that *Cintia* were to be found at an altitude of about 4000 to 4200m, whilst

it was evidently suggested by J.D. Donald that *Weingartia westii* were to be found accompanying *Cintia*. However, it would appear from the reported altitudes at which *Weingartia* has been found, that an altitude of some 4000m to 4200m is above that at which *Weingartia* appear to grow.

.....from B. Bates

From the map of the area around Otavi it is quite clear that there are very few mountain tops which are in excess of 4000m, probably less than half a dozen. The Cerro Nuqui, for example, has a height of 4088m.

.....from H. Middleditch

The contour lines round the Cerro Nuqui and other peaks in this area are closely spaced, which is indicative of sharp peaks with steeply sloping sides. This appears to be typical of most of those individual mountains, or group of peaks, which stand out in ascending well above the general level of the altiplano. This seems to be at variance with the "upland plains" quoted by Knize and Riha which is a description that might conceivably be applied to the altiplano with its typically easier gradients. The altitude of around 4000m also seems to be rather a high elevation at which to find even *Parodia maassii* which the authors also associate with *Cintia*.

Around Otavi the "upland plains" of the altiplano tend to lie at an altitude within the range of 3300 to 3500m, an altitude at which *Parodia maassii* are very likely to be found. Consequently it would appear to be reasonable to query the accuracy of the 4000m elevation quoted for the habitat of *Cintia*.

.....from M. Lowry

Having become aware, from the translation of the Czech first descriptions by G.R. Allcock, of the area in which *Cintia* had reportedly been found in habitat, we decided to make a stop in the area during our 1996 expedition to Bolivia, in order to look for these plants. The salient features of the habitat given in the first description are that the plants occur at 4000m altitude near the towns of Otavi and Lecori and that they grow alongside *Oreocereus fossulatus* and *Parodia maassii*. After studying the 1:250,000 scale map of this area it quickly became apparent that there are very few places of the correct altitude in this region of Bolivia. Only on a small range of mountains running NNW to SSE a few kilometres east of Otavi are these elevations to be encountered. It was on these mountains that we aimed to search for *Cintia*. From Potosi the main road travels south about 45 km to Chuchu Ingenio, then in an eastward direction for about 30 km, before it turns to the south-east, passing close to Otavi on the way to Padcoya, where the road again turns south to go towards Camargo. From Huari-Huari we used the route through Villa Tavalera (Puna) to join the Potosi-Camargo road at Belen, about 30 km north of Otavi.

The landscape here was fairly typical of this part of Bolivia, with broad areas of ground that appeared to be either flat or gently sloping, and equally extensive areas of undulating hills and of wide mountains. Nowhere did steep slopes lead to sharp mountain peaks; rounded or flat topped mountains met the eye in every direction. Some 25 km after joining the main road, however, the first of the high mountains came into view; this was our first sight of the Cerro Nuqui. We made our approach across the Quimsa Kocha Pampa, a high altitude plain at 3420m. The ground seemed to be almost devoid of vegetation and would probably be covered with gravel and stones, as it was alongside the road. The only vegetation we saw was a few hummocks of *Tephrocactus bolivianus*. The Cerro Nuqui is an imposing sight when viewed from the pampa, rising 648m above its surroundings in a nearly perfect cone. We picked a track that passed for a road and started to climb the lower southwestern slopes of the Cerro Nuqui. Here there were patches of better vegetation, with taller bushes, mingled with shrubs and herbs and even tufts of grass, but still with more bare stony ground than vegetation cover. New growth and greenery demonstrated that the rainy season had indeed started, but nevertheless there was very little in the way of greenery.

By the time we had reached 3500m, it became obvious that the track would not take us any higher for it was now only a footpath through the shrubs! We stopped, split up, and spread out to discover what grew on this hillside. It was on these rather steep hill slopes that we found a healthy mixed population of cacti, including many specimens of *Helianthocereus tarijensis* and *Oreocereus celsianus*, the occasional hummock of *Tephrocactus*, together with *Parodia maassii*, *Lobivia ferox*, *Lobivia versicolor*, and *L. cinnabarina*. Here and there, wedged in cracks in the rock or half-buried in the ground, we also found *Rebutia pygmaea* and *R. atrovirens*. But, search as we might, not a sign of *Cintia*. As we climbed higher, the cacti gradually became less frequent so that eventually at about 3800m there were none, not even *Parodia maassii* with which *Cintia* is supposed to grow at 4000m. After a couple of hours searching we were obliged to depart in order to reach our overnight stop at Camargo by nightfall.

On our 1997 expedition we again searched for *Cintia* in the same area. This time on our way north from Camargo we stopped at Alto Lecori, which consists of little more than a couple of rudimentary dwellings roughly half way between Padcoya and Otavi. We searched on the slopes of Cerro Lecori on the southwest side of the main road, as well as the hills lying more to the northeast, but again without success.

.....from T. Marshall

On our 1996/97 trip to Bolivia we went up the lower flanks of the Cerro Nuqui, stopping at BLMT 57 which was about 3800m. These flanks were fairly well vegetated, but the vegetation was low, as usual at this altitude. The vegetation here was *Acacia*, shrubs of *Calceolarias*, tufted *Festuca* grass, *Lobivia ferox*, *Rebutia pygmaea*, *Portulaca* with a tuberous root and large stands of *Oreocereus celsianus*, which did not exceed 2 metres in height. Cultivation on these slopes seemed to occur up to a point where solid rock makes it impossible! The angle of slope tends not to limit cultivation as machinery does not appear to be used. However, the greatest intensity of cultivation was seen on the gentler slopes, such as saddles between hills.

On our 1997/98 trip to Bolivia we also made a stop near Alto Lecori in order to climb the Alto Lecori, again to look for *Cintia* as this was reputed to be another location for these plants. Again we had no success. However we did find *Parodia maassii* right at the top of the climb, together with *Lobivia ferox*, and various

Trichocereus; the leaved vegetation here seemed to be much akin to that on the slopes of Cerro Nuqui. Has anyone seen *Cintia* in the wild apart from Karel Knize?

.....from H.Middleditch

This last report does confirm that *Parodia maassii* can occur in this area at virtually 4000m altitude. Now the authors of the above article suggest that *Neowerdermannia* is to be found widely distributed at 4000m altitude and even up to 4500m altitude. How does this statement compare with other records?

.....from J.R.Kirtley

Early in the 1989 trip to Bolivia with B.Bates, we took the main road which goes south from La Paz, turning off at Panduro to go in the direction of Eucalyptos. Reaching the first hill out of Panduro, on the north side of the road, we found *Neowerdermannia*, at B/K 5 at an altitude of 3760m. A short distance further on we again found these plants at B/K 6 at 3840m altitude.

.....from B.Bates

When revisiting Bolivia in 1992 we turned off the main road at Panduro, stopping at Quelcata, close to the B/K 5 site, again finding *Neowerdermannia* at 3800m.

.....from R.Hillmann

Travelling in north-west Argentina we came across *Neowerdermannia* at Cangrejillos at 3550, at Tafna at 3750m, at Santa Catalina at 3800m, and at San Francisco at 4050m. Also between Iturbe and Iruya at Abra Condor at 4000m and then again beyond the pass at 3700m. In Bolivia these plants were found near Panduro at 4100m, also on the road to Oruro at 4000m and at 4100m.

.....from P.Down

On the 1992 trip to Bolivia we made a stop some 20 km to the south of Oruro at BDH2 where we came across *Neowerdermannia* at 3750m.

.....from M.Lowry

In the course of the 1997/98 trip to Bolivia we set off from Atocha on a route which in due course brought us to San Vicente; at four of the stops which we made on that section of our journey we found *Neowerdermannia*, firstly at 3847m, then nearer to San Vicente at 4089m and also at 4332m, then en route from San Vicente to Tupiza at 3993m

.....from R.M.Ferryman

My very first visit to Chile took me into the very northern part of that country, where *Neowerdermannia* was found near Belen at 3450m, and also near Tignamar at 3350m.

.....from R.Hillmann

On my recent trip to northern Chile we found *Neowerdermannia* at 3200m near the village of Zapahuira.

.....from H.Middleditch

These recorded sightings would suggest that the statement by Knize & Riha that *Neowerdermannia* is to be found "above the 4000m mark" are only just confirmed by the foregoing reports. And there is certainly no available record of *Neowerdermannia* being found at altitudes approaching 4500m. A possibly comparable discrepancy may be seen in the field records for observing the occurrence of *Neowerdermannia* at Panduro; this is at 3760m per the B/K 5 record and at "Panduro 4100m" as recorded by R.Hillmann. In this connection it may be appropriate to note that the J.Fahr field notes include entries such as "FA 53 2955m (2738m)", the explanation being that one altitude figure was taken by portable barometric altimeter, the other by G.P.S. On the face of it, the altitude figures for *Neowerdermannia* quoted by Knize and Riha do appear to be too high, possibly by as much as 500m. Likewise the statement that *Cintia* was originally found attached to a *Parodia* would suggest an altitude some 500m or so less than the "4000m to 4200m" quoted for the typical *Cintia* habitat. Similarly the author's "upland plains" which, in the general area around Otavi, again lie at some 500m less than the quoted altitude at which *Cintia* is to be found. It is by no means impossible that these anomalies are the usual commercial ploy to mis-direct other interested parties visiting this area. Or the discrepancy could be explained just as in the J.Fahr field notes.

.....from B.Bates

During our 1998 trip to Bolivia we were able to have a few words with Ramirez Bros. who have collected seed from various places in Bolivia. They were able to confirm the general whereabouts of the *Cintia* habitat, which does indeed lie at around the 4000 metre altitude.

.....from A.W.Craig

The seed which was set by crossing the flowers on my two KK 1768 *Cintia*, was then sown. One of the resultant seedlings is now three years old and it has just produced a flower, which was just as large as the parent plant alongside.

## **SOME REFLEXIONS ON THE TEPHROCACTUS From C.Holland**

In the review of *Tephrocactus bolivianus* in *Chileans No.55* there were reports of the diversity of the spination observed on these plants in habitat. In particular comments were made about some plants in habitat having spines which stood straight out from the segment with the topmost ones very nearly upright, whilst other plants displayed spines which bent at right angles on leaving the areole.

In my own collection there are now plants which were raised from seed purchased from commercial sources, but identified as being from a specific habitat. Among these are plants from Alfarcito and from Tastil, both in the Quebrada del Toro. The plants from these two places look more or less identical and new spines appear in the same way. Apart from a few weak bristly spines on the lower areoles, it is the areoles at the top of the segment which produce the spines. The new segments do not display any distinct tubercles but the



uppermost areoles are effectively situated on a "step" so that the areoles face almost upwards - more so at the apex, rather less so below the shoulder of the segment. The new spines project straight out of these areoles and so the uppermost spines point upwards, the lowermost ones - about a quarter of the way down the segment - project half-outwards, those between adopting an intermediate attitude. In addition there is often one shorter and very slender spine per areole which curves away from the areole and points horizontal or even slightly downwards. There are between one and four robust spines per areole.

Later in the same season in which these new spines have appeared, they reflex by bending sharply at the exit from the areole. The bend can be so sharp that the very lowermost visible part of some of these spines can lie against the body of the segment, but mostly they are clear of the segment by only a mm or two. They bend so that most of the length of the spine lies at right angles to the vertical axis of the segment. The segments in the middle of the plant are more or less vertical whilst those round the outside point outwards to some extent, and consequently the reflexed spines tend to follow the contour of the plant as a whole.

.....from H.Middleditch

On the photograph on the inside front cover of *Chileans No.55*, taken near Cuchu Ingenio by F.Vandenbroeck, may be seen a number of segments of *T.bolivianus*. The bright green segment centre right of frame appears to be growing at the time the picture was taken. This segment appears to be somewhat tuberculate with areoles located at the very top of the tubercles, so facing more or less upward. As far as it is possible to see, all the spines on this new segment are shortish and face upwards. A scrupulous examination of the picture would suggest that the spines at the back of that segment, some upright and some bent horizontally, are of significantly greater length than those on the new segment and so would belong to an old segment which is not visible as it is immediately behind the new green one. On the older segment immediately to the right of the new green segment, the spines are almost all bent at right angles where they emerge from the areole. Other segments display deflexion of the spines intermediate between these two. Evidently the subsequent deflexion of initially upright spines which has been observed in cultivation does occur in habitat, too.

.....from G.Hole

Having taken a good look at my own *Tephrocacti* in the middle of the growing season, I find that almost all of this year's new segments seem to start off with spines that are practically vertical. Not only those of the *articulatus* group, but also plants of the *glomeratus* group and of the *bolivianus* group. It is later in the year when the spines bend back, but not all of them bend in this way. Sometimes it is all the spines at one areole that bend but at some areoles there can be a spine or two remain in a more or less upright attitude with another spine bent sideways. It is usually the areoles near the top of the segment that have both upright and bent-back spines, with the areoles lower down the segment having mostly spines directed sideways.

.....from H.Middleditch

It has been noted previously in these pages that on certain plants of the *T.articulatus* group, the spination on new, growing, segments adopts a semi-upright attitude, which is maintained until about the end of that current growing season. Over a remarkably short space of time, which can be less than two weeks, all the spines on the current year's new segments deflex and adopt an attitude decidedly more nearly horizontal. It would now appear that this feature can also be observed on certain of the hummock-forming sort of *Tephrocacti*.

When Roberto Kiesling was on detachment to Kew he gave away cuttings of a "*Tephrocactus* sp. *Arrequentin*" which it would appear can be classed as *T.bolivianus* (*Chileans No.55* p.8). On my own plant of this sort, the spines on the older segments adopt a more or less half-outwards attitude, even those arising from areoles in the uppermost part of the segment - although on some segments there may be one or two spines from the topmost areoles which do point virtually upright. Now I see that on the half dozen new segments which have been produced this year on "*sp. Arrequentin*", all the new spines are pointing virtually upright - the spines from areoles part way down the segment displaying a very slight outward lean. Presumably they will move to a half-outward attitude typical of all the older segments, later in the season.

A change in the attitude of the spines is also to be seen on my PW 6085 which was raised by T.Edney from the seed collected in the course of the John Watson Southern Andes Expedition. To judge by the general habit of the spines, this plant may possibly be *T.platyacanthus*. On the older segments the large sword-shaped spines bend downwards sharply at the exit from the areole, to such a degree that many of these spines lie close up against the body of the segment for much of their length. But on more recent growth, some of these sword-shaped spines point half upwards and at another areole on the same segment they point half-downwards. On the newest segment which is still growing part-way through the season, the juvenile sword-shaped spines stand bolt upright at the apex of the segment and even half way down the segment these spines are pointing not far off the vertical. So evidently these upright spines of the current season do also subsequently bend downwards.

It was on our visit to the Riviera in 1962 that a *Tephrocactus* was purchased which lacked any real identification. The segments are very chunky, roughly similar in length and diameter, with very broad sword-shaped spines of a pale buff colour; almost all the spines bend downwards to such an extent that many of them are pressed hard up against the body for part of their length. But the most outstanding feature is the cross-marking (or shading?) on the spines. This is most indistinct on the new spines which display an ill-defined central stripe of purplish brown colour; but the cross-banding is more obvious on older spines, and very clear on many old spines. It consists of narrow cross-bands of darker colour separated by equally narrow cross-bands of paler buff colour. Even the cross bands themselves give the impression in places that they are made up of fine micro cross-bands. The consensus of views as to possible identification of this plant would favour *T.platyacanthus*.

Over the intervening thirty five years this plant has (until fairly recently) not grown well at all. It had been broken up and segments passed on to other collectors, the remainder now being in two parts of about eight to ten segments each, both smaller than the original purchased plant. One of these two plants is kept in the unheated part of the greenhouse all year round, the other is kept within a foot of the ridge of the greenhouse. From where it has to be taken down in order to see how it is growing. Imagine my surprise to find, for the very first time, that the new spines on this year's segments are not projecting downwards at all, but the majority are projecting upwards parallel to the long axis of the segment. It is on the areoles part-way down the segment that there are some spines which project either half-upward, or directly outward; on the lowermost areoles there are one or two spines which even have a slight downward direction. It would be rather surprising if all this year's spines did not deflect to a downward-pointing direction before next season and so adopt the same disposition as all the other spines of previous years' growth.

.....from C.Holland

Now you have asked about a change in attitude of the spines on any other Tephrocacti, I have to say that it probably occurs on most of my Tephrocacti. To such an extent that it would not really be practicable to give you a list of the species names involved, as it would very likely amount to most of those in my collection. Basically, it seems to be a feature of Tephrocacti, although having said that I would admit that it does not necessarily happen on every plant.

.....from H.Middleditch

Quite different is another plant which I am inclined to regard as *T.platyacanthus*. It was received as a vegetative propagation via R.Crooke from the Leighton-Boyce collection. The new growth at centre frame Fig.32 in the Leighton Boyce and Iliff "Tephrocactus" is almost duplicate of the habit of my own plant. Hence the probability is that the donor plant was that pictured in Figs 31,32, & 33 of that publication. From these three photographs may be seen the totally different nature of the spination produced by the older and by the newer growth. On what appears to be the older segments, the spines are deflexed downwards to such an extent that many of them lie close to the body of the segment. By comparison, the spines on the newer growth are a good twice the length and width of those on the older segments and these newer spines are, to a large extent, directed sideways from the segment, together with a number which are undoubtedly more deflexed. My own plant of (presumably) this same sort, produces good strong spines on the new, growing, segments which stand half-upright relative to the long axis of the segment, or even more nearly upright. Over the last seven or eight years since I obtained this plant, all the segments have produced and retained a virtually identical set of half-upright spines. Not a single one has deflexed downwards.

If an old and a new segment had been taken from the Leighton-Boyce and Iliff Fig 32 plant and laid side by side, it would have been quite understandable if most observers had regarded them as two different sorts. The semi-upright attitude of the spines displayed by "this year's" growth on PW6085 could be described, if one wished, as a juvenile form of spination and the persistence of this spine attitude over a period of several years on the ex-LB Fig.32 plant could likewise be described as retention of the juvenile form of growth. It has been observed by K.Gilmer (Chileans No.55 p.7) that at TG 41 there was to be seen *T.bolivianus* with spines on some plants set at a semi-upright attitude and on other, nearby plants, spines bent sharply at the exit from the areole which appeared to be more in accord with the original Salm-Dyck description. Is it feasible that those plants at TG 41 with the sharply bent spines would display semi-upright spines on "this year's" growth, and the plants at TG 41 which are without the sharply bent spines are simply continuing to display the juvenile form of spination?

It would appear that the existence of outwardly-directed spines on various Tephrocactus can be a feature of the current season's growth, rather than a feature of mature segments.

.....from J.Iliff

[Reference Tephrocactus bolivianus, variation in spination, Chileans No.55] Unfortunately, as that great botanist the late Mrs. Vaughan once remarked, plants do not read books. It has been said time and time again, that these dwarf opuntias are very variable. Your assiduous attention to the descriptions recalls a solicitor obsessed with the smallest print in an Act of Parliament and seems to restrict your ability to allow for such variability; you seem to regard any departure from the original with the deepest uncertainty. At the same time you seem to have incorporated basic preconceptions into your interpretation of the text that I find unwarrantable, and to which I refer in a moment. You must use your imagination, first to penetrate the intentions of an admittedly not very clear author like Salm-Dyck, and then to use your knowledge of the description to form a working picture of a norm around which you can group plausibly relevant individual specimens. You must take into account all the relevant characters that you can recognise and not get especially hooked up over one or two such as spine number or posture. And it is especially important, where characters are not mentioned in the original, to try to add these to your picture on the basis of the indications given by the material that best agrees with what is specified there.

One of the things that stands out about the sources of Salm-Dyck's time is that order of presentation plays an important part. The first thing Salm-Dyck states about the spines is that they are "erecto-divergentibus longissimus", (note, "erecto" first) - next, "lineari-extensis" - stretched out in a line which implies alignment with the long axis of the segment. Flexilibus means "bendable", not "bent". Lastly, it is completely perverse to suppose that the additional information "basi erecti collecti" refers to the interior anatomy of the areole. Salm-Dyck plainly writes for interested enthusiasts like himself, and refers to what can be readily seen. The obvious inference is that his spines were close-drawn towards the base, as in your picture of the individual segment of TG 41 or GC 163.06. The supplementary information "bent here and there", relegated to the additional German text, reads like a conscientious attempt to take note of special cases, as in your picture of TG 12.

You appear to be suggesting that the GC 164.07 (with the spines sharply bent at the exit from the areole)

may particularly represent the kind of plant seen by Salm-Dyck. How on earth you can reach such a conclusion I do not know. If this really represents your considered opinion, then I have hardly the heart to pursue this further. I would only add, that you should remember, Ritter also appears to believe that Salm-Dyck's material was of this kind. I do hope that you and your members realise that Ritter misunderstood *Opuntia boliviana* S-D. You will of course appreciate that it was *Opuntia chichensis* Card. that Ritter mistakenly thought to be *Opuntia boliviana*. On *O.chichensis* the spiniferous areoles can extend far down the side, the spines may sometimes be bent and twisted in all sorts of directions and vary greatly in length, and there could be at least 15 in the upper areoles.

The whole question of discussing the precise interpretation of Salm-Dyck's description of *O.boliviana* is really beside the point. The name *Opuntia boliviana* Salm-Dyck has now been neotypified (Kiesling, *Estudios en Cactaceae de Argentina: Maihueniopsis, Tephrocactus y Generos Afines (Opuntioideae)* in *Darwiniana* 25: 1984). At the present time, the neotype fixes the application of the basionym, and with it all valid transfers of the name to other genera. The fact that Backeberg interpreted *Tephrocactus bolivianus* differently in 1950 & 1958 does not affect the question since he did not expressly exclude the type in so doing (Art. 47.1) The fact that we may not think Kiesling was right to refer the name to *Maihueniopsis* does not affect the question, for his neotype attaches to the basionym (Art. 7.4). The fact that Ritter interpreted the basionym in a different sense under his *Cumulopuntia boliviana* does not affect the question even though it has priority, since he did not formally designate a neotype to fix the application of his alternative interpretation.

I accept the application of the neotype, which, I think it is fair to say, is broadly speaking in agreement with your photograph taken at TG 41. This means that, as things are at the moment, a specimen of this kind gives us the interpretation of the name we must all follow. If you do not accept the application of the neotype, you are at liberty to propose that it shall be superceded (Art.9.12). There is nothing to prevent you doing this, but you will of course have to publish your proposal. You will be required to make a case for believing that the existing neotype "can be shown to differ taxonomically from the holotype or lectotype that it replaced". As there is no holotype or lectotype that might formerly have fixed the application of the name, but only a description, it is the existing neotype that you must question. The proposal will thus inevitably remain in the realm of opinion.

.....from H.Middleditch

The foregoing observations were received after J.Cliff had been provided with the same data that is presented in *Chileans* No.55 pp.3 et seq. These comments may well represent the academic approach to nomenclature, but they would not appear to be of great value to the cactophile who desires to have some logical basis for deciding what name to give to a plant either seen in habitat or grown in cultivation. In addition, the *T.bolivianus* which may be seen on the inside front cover of *Chileans* No.55 evidently possesses certain segments which differ one from the other in respect of the attitude of the spines. An author could select any one of these particular variations and describe it as a Neotype. Again it is not at all clear how this would help those wishing to put a name to a *Tephrocactus* in the field or in the greenhouse.

There would appear to be a consensus of opinion amongst those participating in the *Chileans* Weekends, that the name *T.bolivianus* can be applied to plants seen over a wide area, from the altiplano south of La Paz in the north, via Potosi and Yunchara to northern Argentina, on the mountains alongside the Quebrada Humahuaca, along the Quebrada del Toro, to Abra del Infiernillo. And even an extension to Hualfin and Arrequentin.

Adopting this view raises the question of how to separate such a conception of *T.bolivianus* from *T.dactylifera* Vaupel, and even from *T.ignescens*. The extensive territory north and west of La Paz where these three names may be separated, overlap, or intergrade (as the case may be) has not been at all well travelled by cactus enthusiasts so that any thoughts on this aspect can only be somewhat tentative at this stage. In addition, if it becomes accepted that *T.bolivianus* extends to the vicinity of La Paz, then it raises the question of what might constitute *T.pentlandii*.

## **LOSING SOEHRENSIA FLOWERS    From P.Bint**

In the late 1970's I obtained some NCSS seed of *Soehrensia* R 547a, a *Soehrensia formosa* variety and from that germination I still have one plant which is now taller than it is broad. Unfortunately it has shown no inclination to flower and I suspect it will have to increase in stature before it does. However, the taller of my two *Soehrensia bruchii* has flowered on three separate occasions. The flowers are produced from varying positions but never at the growing point. Flowers have appeared at 3 or 4 areoles from the centre to a position more or less half way down the side of the body. Never have all the buds successfully matured into flowers, only about half of them in each year it has flowered. The most recent attempt at flowering started with ten buds, but nine of these aborted and only one blossom opened. I am led to believe that it might need excessive amounts of water in the early bud formation period, so next time it buds up I am going to flood it with water and see what happens.

From what I can see of the slides taken of the flowers, the style tends to remain more or less upright in the centre of the flower.

.....from R.Purslow

Is it not possible that the problem with *Soehrensias* losing flowers could be due to shading? Here in Croydon my plants are not exposed to all-day sunshine as they were in Bedford, as the surroundings prevent the rays of the sun falling directly on the greenhouse for part of the day. I am not suggesting that *Soehrensias* need to be put up near the ridge of the greenhouse, simply that they should get all the sunshine that there is



during the day.

.....from R. Senior

Losing buds on *S.bruchii* has never been a problem for me. My plants are out of doors, sheltered by walls and hillside from north and easterly winds, but really get as much sun as occurs here in Cornwall.

.....from M.Muse

My *Soehrensia korethroides* was acquired in 1983 at which time it would have been about 10 cm in diameter and more or less completely spherical. It was probably acquired from Brookside nurseries on the occasion of a visit they made to Leicester NCSS branch. There is no means of knowing the age of this plant, since at the time of the acquisition it had probably made no growth for a couple of years - I had to remove the compacted clay-like soil from the roots with a 1.5 lb ball peine hammer. Since that time it has attained a diameter of 13 cm and a similar height. It flowered in the summer of 1987 and the floral scars can still be seen halfway down the body, seven areoles down from the crown, whereas the scars from the flowering of two years ago are three areoles away from the centre of the crown, a distance of perhaps 3 to 3.5 cm. There has now been significant new growth in the crown with the production of new areoles as well as bright new spines, so I am hopeful that it will flower again.

On the last occasion there were three flowers close to the crown. They were very short and stout, about 8 cm long by 7 cm in diameter; there was no suggestion of a tube, merely a corolla standing on an ovary. The tips of the petals were flushed orange on their inner surfaces and the flowers did not open out but remained urn-shaped. The vivid green style, about 3 cm long, was held erect more or less in the centre of the flower, a sharp contrast with the blood-red anthers. Attempts to set fruit with pollen from either *Echinopsis* or *Lobivia* have been unsuccessful.

At the same time my R.129 *Soehrensia rosarioana* also flowered; there is an interstaminoidal gap of about 1 cm between the throat stamens and those in the tube, whilst the stamens are much more numerous than on my *Soehrensia korethroides*. Also all the flower elements on my R.129 are a more or less uniform pale yellow. The flower length has been measured on more than one flower and this figure does vary within a couple of cms, a factor that may be influenced by the time of year and hence day length. I was able to set fruit by crossing the flowers on this plant. The mode of dehiscence on these latter was most unusual; three vertical splits appeared around the broadest part of the fruit, which initially did not extend upwards and downwards the full length of the fruit.

In addition, I have three other plants of this affinity: (a) from collected seed without locality ex Kohres, (b) from collected seed ex Rausch, again without locality, and (c) from seed collected from near Belen by Kiesling. The ex-Kohres plant has stiff, subulate, red spines, the WR plant has rigid, stout, basally thickened spines, whilst the RK plant has curved, markedly shorter, subulate spines. All these plants are smaller than the plant which has flowered, which has mixture of red-brown and off-white, long, almost bristly spines. All four plants have obtuse ribs with a slight undulatory rise or hump between each pair of areoles. This feature is scarcely evident on my plants of MN1, MN3, and DJF 283, all *Soehrensia bruchii*.

.....from H.Middleditch

The slides of the flower sections taken by M.Muse show a comparatively short style on *S.korethroides* which carries the stigma well above the topmost anthers, where it projects slightly above the reflexed petals. The style is upright in the middle of the flower both on this plant and on R.129. In addition, the filaments on R.129 appear to be uniformly distributed over the depth of the tube, whereas on the flower of *S.korethroides* there appears to be a distinct gap between the general body of the filaments and the throat ring.

.....from C.Holland

Both my *S.ingens* at 5 inches diameter and *S.grandis v.aureiflora* WR 129 at only 3 inches diameter, have flowered now, as well as my *S.formosa*. My recollection of all the flowers, is that the style was carried more or less centrally in the flower.

.....from F.Vandenbroeck

In regard to the disposition of the style and stigma in the flowers of *Lobivia formosa* sensu Rausch, I can tell you that as far as I have seen, they are normally held erect in the centre of the flower. I have some very good close-up photographs of open flowers on some of these plants - a whitish flower of *v.bertramianus*, seen near Leg. Uru Uru, Oruro, and a red flower on *v.tarijensis* from Cruce Mojo. In both pictures the style and stigma are perfectly in the centre of the flower.

.....from H.Middleditch

If you have the opportunity to do so, would you care to check this feature if you come across any of these plants in flower in the course of your forthcoming visit to Bolivia?

.....from F.Vandenbroeck

During our trip to Bolivia in January-February 1997 I particularly paid attention to this feature although most of these plants had started setting fruit. There were few flowering plants to be seen, and fewer with flowers that could be reached, because most of these plants grow over 2 m tall and then the flowers at the top are out of reach. Those we saw were on the red flowering *v.tarijensis* and much to my surprise the style and stigma were fully inclined to the side of the flower tube. During my earlier travel I had made pictures of these flowers where the stigma and style were perfectly in the centre of the flower. I believe the explanation of this phenomenon lies in the degree of freshness of the flower. I observed a similar process in some *Trichocereus* where, in relatively fresh flowers, stigma and style were fairly erect.

.....from C.Norton

My plant of *Helianthocereus poco* was purchased about thirty three years ago from a collection in Hull which was being sold up. It was then about one foot high but it has been growing for many years with a free root run and it is now 8 feet tall and still solitary. It would be about twenty five years old before it produced its

first flowers, when it was roughly five feet high. The flowers stood almost vertical between the top of the shoulder of the plant and the growing point.

A friend of mind bought a plant of *Helianthocereus tarijensis* from Woolworths for ten shillings and six pence in 1966 when it measured four inches high. It later came into my possession. It is now about six feet tall and 11 inches wide, a magnificent plant, which is also bedded out. This also flowered for the first time when it was about five feet high, again producing more than one flower at a time. The disposition of the flowers and the flowers themselves were very similar on both plants. Both plants have 23 ribs, but whereas my poco has fine bristly spines, the *tarijensis* has longer and stronger spines with a few bristly spines, so in appearance they are quite distinct from one another.

.....from H.Middleditch

My *Soehrensia rosarioana* managed to produce six flowers this year, of which one opened on its own to start with, followed by four opening together, these being joined two days later by the last one. The first flower had the style more or less in the middle of the flower but not precisely straight nor exactly in the centre of the flower. The stigma lobes were unopened, but held together in a rather untidy manner. On the second day the flower retained this appearance, but towards the end of the third day the style adopted a leaning attitude, resting against the stamens; in addition, the stigma lobes had opened out. This flower was looking decidedly untidy on the fourth day when it was forcibly closed from one side by the next set of four flowers. This time, the styles on two of the flowers adopted the rather untidy central disposition of the first flower whilst the styles on the other two flowers were leaning against the inside of the petals, with partially opened stigmas. The barometer was high, the sky being cloudless but slightly hazy and it was very warm indeed, the dial thermometer in the greenhouse registering 120°F; the door and all ventilators were wide open but there was very little breeze. These conditions may not have been what the plant would face in habitat, and its reaction might not be that seen in habitat. The pattern adopted by the first flower under less extreme conditions may be more representative of habitat sequence.

Perhaps one of the more distinctive features of the flowers of (non-leucantha) *Echinopsis* and of many *Trichocereus* is the very obvious stigma, well exposed in the mouth of the flower, carried on a style which droops against the lower wall of the flower tube. In his *Lobivia* '85, Rausch has put all *Soehrensia* and some *Trichocereus* spp. into his expanded *Lobivia*, but he does not appear to concern himself with whether the flowers of these *Soehrensias* do display the upright style, more or less central in the flower, as expected in *Lobivia*. As usual, Rausch tends to make statements with a lack of supporting data. His photograph of *Soehrensia rosarioana* (p.49, *Lobivia* '85) clearly displays a stigma on a style rising centrally in the flower tube. Of the two open flowers in that picture, that with the stigma lobes barely parted from each other, carried well clear of the surrounding anthers, is presumably "today's" flower; whilst that with the almost wide-open stigma lobes spreading out and touching the topmost anthers, is presumably "yesterday's" flower. It is difficult to see any sign of stigma lobes in his pictures of the flowers of *S.grandis* or *S.bruchii*, whilst in both pictures of the flower on *S.walteri*, the style and stigma are clearly leaning right against the side of the tube. However, there is no mention in any of the accompanying text regarding the disposition of the style and stigma on these plants.

.....from D.Aubrey-Jones

The interpretation of the age of the two flowers in the picture of *Lobivia rosarioana* in Rausch *Lobivia* '85 would seem to me to be reasonable. My own plant of *rosarioana*, raised from seed, has now flowered and I notice that the stigma lobes remain more or less in an upright disposition, closely parallel to each other, for the first three days on which the flower is open. On the last day of opening, the stigma lobes are spread out into something like a cup shape.

.....from H.Middleditch

For those who are fortunate enough to flower any *Soehrensia* there appears to be ample scope for making useful observations on the nature and disposition of the style and stigma in these flowers. There may be some consistency in these features but this could only be established on the basis of observations made on a number of plants, preferably in more than one collection i.e with different microclimates.

.....from F.Kasinger

Travelling from Punta de Balasto on the Rio Santa Maria we took the road in the direction of Hualfin and Belen. After Hualfin, near El Eje we turned sharply northwards on Ruta 43 which leads to Antofagasta de la Sierra, over 150 km away. This road took us over Villavil to the Cuesta de Indalecio, El Bolson, and Barranca Larga, where our vehicle came to a halt in a large sand-filled hole in the road. An hour later we were still stuck in the same spot and it was only thanks to the Argentina border police who happened to come along the road that we got a tow out of this trouble. During our stop there we found the time to discover a rich cactus habitat where there stood *Gymnocalycium*, *Soehrensia*, *Denmoza*, *Tephrocactus*, *Opuntia* and *Rebutia*, all growing side by side. Almost in the darkness of the night we retraced our steps and later arrived in Belen.

.....from H.Middleditch

This is a very valuable piece of information as no previous report of *Soehrensia* appears to have been made from this location.

.....from F.Kasinger

The *Soehrensia* here were all globular with long yellow spines, but they were not in flower, although I imagine they will have yellow flowers. They were similar in appearance to the *Soehrensia* I saw in 1991 near Abra Infiernillo, standing in company with *Parodia tafiensis*.

.....from J.Lambert

We took this same road leading to Antofagasta de la Sierra in 1993, but did not get beyond Los Nacimiento de San Antonio. On the way from El Bolson to this spot I actually observed a great number of

Denmozas along this road but did not notice any *Soehrensias*. Perhaps they were higher up, away from the road where I could not get. In Barrancas Largas, I was able to see *Lobivia haematantha v. jasimanensis*, *Echinopsis leucantha*, *Trichocereus pasacana*, *Opuntia microdisca*, *Opuntia cf. sulphurea*, and - above Los Nacimientos, *Tephrocactus bolivianus*.

#### **A FRUITLESS STORY. From P.Moyna**

During our travels I have been on the look-out for *Cereus* and their fruits, and I can attest to having seen *Cereus* in Sierra Mahoma, near San Jose; Minas; Cerro de Montevideo; Colonia, near Conchillas, and generally all over rocky parts of Uruguay. In the first week of May 1998 I made a trip to Caxias do Sul and back and took advantage of this to check for *Cereus* on the way. Our trip started from Montevideo, via Pan de Azucar, San Carlos, and Rocha, to Chuy. After the border, Santa Vitoria do Palmar, Rio Grande, Pelotas, Porto Alegre and Caxias. There were many wild growing specimens on the Brazilian side, particularly noticeable from the border to Pelotas. Neither flowers nor fruit were observed.

.....from N.Gerloff

It is the first week of May 1998. and I am just back from my eighth trip to Rio Grande do Sul. It was interesting to see flowers, unripe fruit, and ripe fruit on the *Cereus* at the end of April. There was fruit on the *Cereus* seen at Gf 840 to the west of Santana da Boa Vista, whilst at Gf 833 at km 361 along the BR 290 to the east of Vila Nova there were *Cereus* with both flowers and fruit.

.....from P.Moyna

Whilst in Caxias do Sul I noticed one plant of a *Cereus* in a garden, with abundant uninjured fruits. I approached the house owner who said that he did not have any recollections of any kind of animal or birds eating the fruits. So, back here in Montevideo, talking things over with my colleagues at the University, we came to the conclusion that the attack on the fruits shown by your picture (Chileans No.54 p.132) seems to resemble the result of attacks by parrots on other fruits. The "Cotorra" is a regional bird of 15 cm body plus 10 cm tail, of loud green colour. It lives in collective nests and can be highly destructive to commercial plantations, for it takes a few bites from each attacked fruit, leaving a deep and wide wound, something quite similar to that shown in your photograph. [Ibid].

.....from C.Spegazzini, *Nuevas Notas Cactologicas*, 1925

*Cereus dayami*, synonym *Cereus dayamii* Britton & Rose. I am obliged to quote this species in order to rectify my specific name which was altered by Britton & Rose. The specific name is the same as that given to it by the Tobas Indians, that is to say, dai-ami, which signifies "food of the parrots".

.....from K-H Prestle

In Uruguay, the large *Cerei* are as good as eradicated in the wild, although one still finds here and there fine examples in gardens! In 1976 there was still a large patch of them in southern Uruguay in the vicinity of Punta Ballena, although their condition was fairly poor. Later even this group was eradicated in order to put up holiday homes for tourists from Argentina, On my journies I have often seen many *Cerei* in flower, both with unripe and with ripe yellow fruits. Often have I eaten the fruits myself.

I have not seen birds eating these fruits myself, although that signifies nothing, as you must understand that there are not a great many large fruit eating birds in Rio Grande do Sul. Today one rarely sees the large-beaked sorts of birds since in my opinion they are very timid and only come to the cacti which carry fruit early in the morning at a time when no-one is about!

It is not surprising that these birds have not been seen by travellers since during the day they generally stay in the bushes alongside larger rivers where there are no cacti so that no-one even goes there.

.....from N.Gerloff

On my fourth trip to Rio Grande do Sul we stopped overnight at Cacapava do Sul and then travelled 200 km to the south in order to try and find some different plants on the Uruguayan side of the border near Acegua. There were admittedly many favourable rocky places to be found there - even many orientated to the sunny side - but unfortunately only a few plants. That was a disappointment to me, especially since some ten species are to be found a short distance away on the Brazilian side of the border.

On my seventh trip to Rio Grande do Sul we arranged to make a four-day visit to Uruguay. We crossed the border at Rivera and set off southwards along route 5. Along the road we did see some *Cereus*, but I wondered why it should be that the *Cerei* are relatively scarce here in the south. On the bank of the Rio de La Plata we could not see any further *Cerei* at all.

.....from H.Middleditch

On travelling to the western boundary of Rio Grande do Sul on the Rio Paraguay, is it possible to cross into Argentina, into Misiones or Corrientes, in order to establish whether the *Cereus* to be found there differ in any way from those in Rio Grande do Sul?

.....from N.Gerloff

Unfortunately there would be a problem. There is no bridge over the Rio Paraguay over the 600 kilometre from the mouth of the Rio Iguazu to Santo Tome, where a new bridge was opened in 1996. The ferries go across the river only once or twice in a day. In 1995 I stood at Porto Xavier for half a day in order to take the ferry, but then it did not run until the following day. So one can easily lose two or three days when making this crossing.



## THE CACTI IN SOUTHERN BRAZIL By E.Ule

Translated by H.Middleditch from *Monatsschrift für Kakteenkunde* 10.8.1900

The cacti bear larger or smaller fruit berries, which usually have a sweet taste, and various kinds of them even serve man as agreeable fruit, such as *Cereus setaceus* S.D., *Cereus pitahaya* Gris., and *Opuntia* sp. In size they range between the peppercorn (in *Rhipsalis*) and the fig (in *Cereus* and *Opuntia*). They mainly have a smooth exterior, rarely furnished with spinelets, which encloses a more or less juicy fruit flesh with many small seeds. The colour of most cactus fruits is a vivid wine-red, specifically so with the epiphytic *Rhipsalis*, *Phyllocactus*, *Epiphyllum*, and *Cereus* - or white with reddish tinge in the abundant *Rhipsalis cassytha* Gaert., and with *Melocactus*. In addition, *Cereus* spp. to some extent display fruit with a greenish or whitish exterior, whereas the fruit flesh is however coloured. The fruit of *Cereus macrogonus* S.D. and also of *Pilocereus virens* Lem. splits when ripe and displays their interior in a fiery blood-red. The columnar *Cereus* in Santa Catherina has yellow fruit and that of *Opuntia* spp. is also yellowish or greenish. For the distribution and propagation of the cacti these coloured and more or less sweet fruits are of appreciable significance, since the wind cannot very well convey them, but probably birds, which consume them and in so doing drop some seeds or even pass them with their excrement. In this manner it is easily explained how the *Rhipsalis* spp. get into the trees and *Cereus* and *Cephalocereus* get on to the rocks. Often have I seen birds investigating the red berries, thus I observed them many times on ripe fruit of *Cereus macrogonus* S.D.

.....from W.Rausch, fourth expedition, G.O.K. Journal February 1971.

We pass through broad valleys where there are *Cerei*, *Opuntia*, and other spiny bushes. The juicy red fruit of *Cereus forbesii*, with dark red pulp, are as large as a grapefruit.

.....from A.Hofacker

The fruit on the *Cerei* in Rio Grande do Sul attains about the size of an egg. Perhaps some fruits may reach the size of an orange, but not bigger. As with all parts of the plants, it depends upon what degree of nutrition is available to the roots, also whether it has received plenty of water, and so on.

.....from U.Eggl

On the question of fruit size on Brazilian *Cereus*, I have not made any measurements but would say that they were 6 - 8 cm long, which is a fair way towards reaching the size of a grapefruit. However, I do not think that grapefruit size is reached by these fruits and, moreover, the round shape of the grapefruit is a poor comparison for the elongate *Cereus* fruits.

.....from K.Schumann, Gesamt. der Kakteen

*Cereus forbesii* Otto .....Fruit as large as a vigorous plum, with red pulp.

.....from C.Spegazzini, *Cactacearum Platensium* Tentamen 1905

*Cereus dayami*. Habitat - frequent in dense woodland of southern Chaco especially near Colonia Resistancia. .... edible berry, elliptical, 6-8 cm long, 5-6 cm diameter.

.....from C.Spegazzini. *Nuevas Notas Cactologicas*, 1925

*Cereus platygonus* Speg. = *Cereus argentinensis* Br. & Rose. Habitat; northern part of Chaco especially near Formosa, and the eastern part of Misiones..... fruit ellipsoidal, 5-6 cm long, 4-4.5 cm diameter....

.....from H.Middleditch

A check on the cactus literature yields several more descriptions of *Cereus* fruit which are similar to the foregoing in respect of the length being somewhat more than the diameter. However, even in orchards under cultivation, fruit are not necessarily always the same size. In addition, if we accept the comment from A.Hofacker regarding variable fruit size, it would appear that the nature of the fruit is characteristic of the genus *Cereus*, but as far as can be established at this juncture the size, shape, and colour of the fruit would not appear to be a means of distinguishing between one species of *Cereus* and another. So the question arises, what name do we apply to these *Cereus* from Rio Grande do Sul, and why? The name *Cereus alacriportanus* might seem to be appropriate for these plants from Rio Grande do Sul and Uruguay.

.....from Britton & Rose, *Die Cactaceae*

*Cereus peruvianus*. Type locality uncertain. No native *Cereus* is known from Peru, .... Our description applies to the plant from the southeastern coast of South America for which the name *Cereus peruvianus* has been used by most recent authors.

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

*Cereus peruvianus* The *Cereus peruvianus* Linne of 1753 was in 1833 described by Meyen as *Cereus arequipensis*; then in 1903 by Schumann as *Pilocereus macrostibus*, and finally by Britton & Rose as *Neoraimondia macrostibus*. It is quite certain that *Cereus peruvianus* (L) Mill. is no *Cereus*.

Werdermann's attempt in *Notizblatt. Botan. Gart. Berlin Dahlem* 1935 to re-found the name *Cereus peruvianus* (L) Mill., was condemned to failure from the start, since he did not refer back either to the original description under this species named by Linne nor to the following one by Miller. In place of these, he sought to establish the name *Cereus peruvianus* on the basis of an old illustration, which appears in the book of De Candolle "Revue de la Famille des Cactees" 1829, which was however another blunder, since the picture and the accompanying comprehensive description stood under the name "Cereus peruvianus monstrosus D.C." No species should be based upon a monstrosity, especially since in this case De Candolle stated that the pictured plant was distinguished not only by its monstrose form but also by an extraordinarily large flower, as may be seen from a comparison of this flower with the flower of *Cereus peruvianus* illustrated in his own "Plantae Grasse" of 1814 on Plate 58.

Nevertheless, Werdermann had believed that the illustration and description of De Candolle's second *Cereus peruvianus* of 1829 was truly represented by the two non-monstrose specimens of unknown origin in

the Huntington Botanic Garden in San Marino (USA). and Werdermann selected these as the Type specimens for a new establishment of the name *Cereus peruvianus* in 1935. This name was then an illegitimate homonym of *Cereus peruvianus* (L) Mill. 1768.

*Cereus peruvianus* was frequently quoted from southern Uruguay, namely the vicinity of Montevideo.

The *Cereus* which I saw near Monte Caseros, prov. Corrientes, Argentina, near the border with Uruguay, is my *Cereus uruguayensis* FR 1438 and probably also a *Cereus peruvianus*.

.....from R.Mottram

There is a comprehensive article by Hertrich in the US C. & S.J. for 1939 No.1, concerned with *Cereus peruvianus*, based upon the plants growing in Huntington Botanic Gardens. However, there is no indication that the origin of these particular plants was known.

.....from H.Middleditch

Over a period of time a number of very valuable slides and prints of *Cereus* which have been seen in Rio Grande do Sul have been received from N.Gerloff and A.Hofacker. These have been screened and displayed at The Chileans' Weekends. Certain of these plants have perhaps up to a dozen branches which appear to display a consistent number of ribs facing the camera, suggesting a constant rib count on that particular plant. On pictures of other plants, however, a new branch with some six or seven ribs facing the camera rises from a plant which probably has five ribs in camera on all its other growth. And on other pictures there are plants with different rib numbers displaying a similar variation. It is perhaps on this account that Ritter's description of his *C.uruguayense* does not quote a rib number. It is equally understandable that Ritter describes his *C.bageanus* as having 7-10 (-12) ribs; and his understanding of *C.alacriportanus* is specified as having ribs initially 4-5, later 5-8, rarely 4 or 9-10. It does appear to be very probable that rib count is not a good identifying characteristic for distinguishing between *Cereus* species in Rio Grande do Sul.

.....from J.Lambert

It always seems hazardous to speculate about the number of ribs on a stem, when one has only a lateral view of it. For instance, the plants pictured at Dom Pedrito and the upper branch of the Cerro Jarao plant, may just as well have either six or seven ribs in total. Whilst on the plant at Sao Francisco de Assis, there is a possibility that the total number of ribs may be no more than five. Generally speaking, however, rib-number is only a supplementary characteristic used in plant descriptions, without major taxonomical value. For one thing, it does change with age, and on the other hand, many species inside a given genus may have very close or even identical number of ribs.

.....from N.Gerloff

We came across a group of *Cereus* near Acegua - which were perhaps even just the one individual plant - where the number of ribs on different stems varied between 5 and 10.

.....from H.Middleditch

It would appear that both the type of vegetation and the cacti to be seen in Rio Grande do Sul do not come to a stop at the Rio Uruguay for something different to start growing on the west bank of that river. The very variable *Echinopsis* certainly extend from Rio Grande do Sul not only across the R.Uruguay into adjacent Argentina, but then further still across the R.Parana into Paraguay. It would seem quite probable that the *Cereus* sp. growing in Rio Grande do Sul would also extend into Misiones. In this context it then becomes necessary to consider *Cereus roseiflorus* Speg., which was originally recorded from Fracran, prov. Misiones. However, there is also JL 112 *Cereus argentinensis* from Sierra de Misiones. Can a distinction be drawn between *C.roseiflorus* and *C.argentinensis*?

.....from J.Lambert

There are a number of characters which allow one to distinguish *C.argentinensis* from *C.roseiflorus* quite easily indeed. These are neither the rib counts, which is 4 to 6 in both cases, nor the spination, even if the ribs are somewhat lower but less flattened in *C.roseiflorus* and if the central spines are somewhat stronger and longer in *C.argentinensis*. The colour of the epidermis provides the first indication, but then especially in young branches, which are bluish green in *C.roseiflorus* as against fresh green in *C.argentinensis*. Moreover, in *C.argentinensis* one notices in young branches some darker transverse bands, which are absent in *C.roseiflorus*. On adult stems, the colour is leaf green in *C.roseiflorus* to glaucous green in *C.argentinense*, but this is not very conspicuous.

Another striking character is that *C.argentinensis* reaches a height of 12 metres, whereas *C.roseiflorus* does not exceed 4 to 5 metres in height. This is of course easily observed in nature, but hardly of any help with cultivated plants! On the other hand, in cultivation in my greenhouse, *Cereus roseiflorus* will flower on stems of only 30 cm tall, whereas one has to wait until *C.argentinensis* reaches nearly 2 metres in height before it will flower.

However, the main difference lies in the flowers, which I was able to examine in every detail on my cultivated plants. First of all, the floral tube carries 5 to 9 vertical grooves in *C.roseiflorus*, which are absent on *C.argentinense*. But now comes the crunch! Whilst the flower of *C.argentinensis* has a normal structure like most other cactus flowers, *C.roseiflorus* makes itself conspicuous by a very special and perhaps unique flower indeed! This feature lies in the structure of the pistil: instead of having simply a number of stigma lobes radiating from the extremity of the style, there is to be seen a number of primary stigma lobes (5 to 6), each of which then branches out into 2 or 3 secondary lobes, so as to attain a total of 14 to 18 stigma lobes! This peculiarity has already been noted by Spegazzini and was fully confirmed by my own observations.

.....from R.Hillmann

Having checked my slides of *Cereus alacriportanus* which were taken in Rio Grande do Sul, I find that only one of these (taken near Minas de Camaqua) includes an open flower. On this picture I am able to see the ridges along the length of the flower tube. But I do not know if any of the other species of *Cereus* from other

parts of South America also display this same feature.

.....from U.Eggl

Unfortunately I am not able to comment upon the presence or absence of grooves on the flower tubes of Brazilian species of *Cereus*, as we never paid any special attention to this feature whilst we were in Rio Grande do Sul. As to the size of species of *Cereus* when first flowering, I have not made any observations in the field. I have experienced top cuttings from mature plants displaying flowers when only 30-50 cm tall

.....from A.Hofacker

There are indeed some populations of *Cereus* in Rio Grande do Sul which produce flowers when they are less than 2 metres high. In particular I observed this in the region around Dom Pedrito - but larger plants also grow in the same area. Most of the *Cereus* start to flower when they are between 2 to 3 metres high.

.....from N.Gerloff

Regarding the question of the size of flowering specimens of *Cereus*: I can well recollect photographing these plants in flower near Pedra do Segredo (Gf 439) and near Lavaras, which were not even one metre high. They could just as likely have been seedlings as cuttings. Many times are the branches cut off by the farmers and then stuck into the ground somewhere else. They then form what is effectively a hedge.

My two cultivated *Cereus* which are from my 1989 and 1991 trips to Rio Grande do Sul are now so tall that they nearly reach the roof of my 1.8 m high glasshouse. They have not flowered yet. Seedlings of Gf 484 are now 10 to 15 cm tall, the Gf 706 only 2-4 cm high! Amongst these seedlings the colour of the epidermis and the colour of the spines varies significantly. A seedling collected in 1992 which is now 70 cm high, started off with 5 ribs, then went to 3 ribs for two years, then 5 ribs again for one year, and now it has 4 ribs.

.....from H.Middleditch

Very fortunately a photograph taken by A.Hofacker near Dom Pedrito as well as another taken by N.Gerloff at km 361 on BR 290, near Vila Nova, both provide sufficiently close-up views of the *Cereus* flowers to enable the longitudinal ridging, fluting, or grooving, to be seen quite clearly on the flower tube. Would this suggest that these particular plants are *C.roseiflorus*?

.....from J.Lambert

The grooves on the floral tube which may be seen on these pictures are indeed similar to those which I observed in *C.roseiflorus* but which are absent in *C.argentinensis*. Incidentally the Spegazzini location for *Cereus roseiflorus* lies along the road from Aristobula del Valle to San Pedro, Facran being located about 30 km before reaching the latter place. This road actually follows the crest of the Sierra de Misiones, which is not very high. The rivers to the northwest of this road flow into the Rio Parana, whilst those on the southeast side of the road flow into the Rio Uruguay. My own specimen of *Cereus argentinensis* JL 112 was collected along the same road, but on the southwest side of Aristobulo del Valle, between Campo Grande and Campo Viera, at 375m altitude.

.....from H.Middleditch

Both these locations lie roughly 45 km from the Rio Uruguay and the border with Rio Grande do Sul. In regard to *Cereus argentinensis*, Spegazzini voices his objection to his name *Cereus platygonus* being displaced by Britton and Rose in favour of their name *C.argentinensis*. Spegazzini does refer to the original *Cereus platygonus* Otto being something different altogether; but as an earlier homonym, does this make Spegazzini's *Cereus platygonus* an untenable name?

.....from R.Mottram

Yes indeed it does. Since *Cereus platygonus* Otto predated *Cereus platygonus* Speg., then the latter is illegitimate under Article 53.1 of the ICBN Code. The Britton & Rose substitution of a new name for it is the standard procedure in such cases.

.....from N.Gerloff

Your photographs of the *Cereus* flowers with the longitudinal grooves on the exterior of the flower tubes as well as your sketch of the bifurcating stigma lobes, have been sent to K-I Horst to see if he can help with any observations. Unfortunately our InterNoto member W.Gemmrich always visits southern Brazil in Spring - usually November - but he has never yet seen any *Cereus* in flower.

## **EL GUANILLO By F.Vandenbroeck Translated by H.Middleditch from Succulenta 74.2.1995**

One of the most fascinating experiences of our trip through Chile was undoubtedly our visit to "El Guanillo". This name is not so easily found on the map as it is a small deserted bay lying opposite a small guano island on the north coast of Chile. The existence of this spot was unknown to me. From the writings of F.Ritter however it was evident that the place of Esmeralda or Mina Esmeralda is an interesting cactus habitat. When we stayed in north Chile in November-December 1990 we looked for this district.

Esmeralda lies not quite 300 km north of the town of Copiapo, on the north coast of Chile. The old Esmeralda mine, mentioned by Ritter is now abandoned. Now there exists a network of tracks which lead to various more recent mines. From a name board it seemed that the Compania Minera Esmeralda was still active, but now in other mines. The tracks which lead from the Pan-American highway over a distance of about 30 km towards the coast, go at first through a bare desert-like area. But as the coast and its accompanying mist-zone gets closer, a scanty vegetation becomes visible which in favourable circumstances can become exuberant and colourful.

The landscape is slightly hilly and displays all shades between yellowish white and redish brown. The track runs alternatively over flat sandy areas and between bare rocky outcrops. Suddenly it drops away in front

of us to an extensive flat sandy terrace filled with specimens of *Copiapoa columna-alba* growing quite close to one another, with their heads slanting away from the wind. They are more robust and more spiny than near Pan de Azucar, an area lying some 50 km or more to the south, where this species also occurs en masse. The weathered parts of the plants are overgrown with a crust of moss. Noteworthy are the numerous young plants of barely a couple of cm in diameter, which project freshly above the ground. Presumably these all germinated during the self-same period of favourable weather. Whilst overlooking this splendid spot a recollection comes to me of an image I know from a photograph. So I take Ritter's Part 3 of his *Kakteen in Süd Amerika* out of the vehicle and in fact Fig. 1039 is a precise reproduction of the landscape that now lies in front of us. Even the contouring of the hills matches entirely. In Ritter's picture is an ancient *Eulychnia* and we find that too!

We now drop further down towards the coast where thick mist hangs low - the start surely of a drizzle, an exceptional and beneficial occurrence in this area! The vegetation is helped by this luxury. The day is far advanced and now it is becoming chilly. The track turns northwards and now we see large clumps of fine *Copiapoas* of a sort which is not familiar to us. We decide to look for a camping site and keep the study of these plants until the following day. A small track goes westwards apparently going right down to the sea. On the flank of the opposite hill a primitive signpost points to the west to "El Guanillo". To our surprise we even come to a marshy spot where bushes of a huge reed (*Juncus* sp.) grows which reaches up to 2 m high. Finally the ocean emerges before us with a rocky island covered with white guano in the distance: El Guanillo! In front of us lies a great white ribbon and behind us lie hills with the most magnificent crop of cacti. We pitch the tent between great hummocks of *C.longistaminea* which grow abundantly on the higher sections of the beach.

The following day started with radiant sunshine and we take a good look at the plants of *C.longistaminea*; the species name is well deserved; the yellow flowers stand wide open with the numerous stamens projecting above the stigma. Now we leave the immediate coastal area and trek further inland. Striking are the large bushes with yellow flowers. On the irregular sandstone slopes stand groups of *Copiapoa grandiflora*. They have a bluish-grey depressed globular plant body with a twisting spination and form open clumps. Unfortunately the "large flowering" implied by the name was not to be fulfilled, as not a single plant displayed a trace of flowers. These plants are often surrounded by a curiously succulent like plant of the *Convolvulaceae* family with handsome bluish-purple flowers. The leaves of this plant are thick and turgid and moreover secrete a sticky sweet-smelling substance. [The individual clusters of leaves resemble an *aeonium* - H.M.]

Further up, usually on the crowns of the small hillocks, we came across large groups of tiny, mysterious greyish-white spined miniature cactus. Each individual head had a diameter of about one cm. To our joy we were standing here in front of *Copiapoa lauii*. This plant was described by Diers in 1980 and seems not to have been found here by Ritter, at least he makes no mention of it. At closer inspection of the plants it was evident that immediately under the body stretches a narrow neck with offsets on which a new head can develop. Below the root neck stretches a 2 to 3 cm long enlarged root. On the self-same hill crowns, growing together with these miniscule *Copiapoas*, we found one other small sort of *Copiapoa* with grey and brownish-red plant bodies. These plants are more robust than *C.lauii* with short spines and sit so deep in the ground that they are commonly completely or half-covered with grit or dust. This was a *Copiapoa* unknown to us.

Another plant which leads a concealed existence here and there and which is only now and again compelled to give itself away by its flower is the small *Thelocephala esmeraldana*. We had the good fortune to see a single flower from this plant standing above the surface of the ground and thus we were able to take a closer look at this sort. The plant bodies are invisible on account of the gravel and grit and normally cannot be found. On removing the surface grit around the flower the brownish-grey plant body comes to light. Astonishingly enough it was evident that we had a quickly trained eye for later on we found a great number of these small mimicry plants, most of which however gave themselves away by flower buds, flowers, or fruit. Growing together with this *Thelocephala* we found a small elegant yellow flowering *Oxalis* with a fine narrow leaf.

In our search for the unsightly cacti we came across yet another of those leading a hidden existence - a small brownish-grey spineless somewhat soft-fleshy globular form shrunken in the ground, possibly *Pyrrhocactus occultus* - surely a plant with an appropriate name. We find only one specimen, which is not surprising. According to the literature it should only occur in a very restricted area i.e. around Breas to the east of Taltal. This area lies as the crow flies some 60 km away from the spot where we now found ourselves. Finally we find, somewhat lower down, mostly at the foot of the sandhills, solitary specimens of the black spined *Pyrrhocactus taltalensis*, a sort of plant which truly has a wide distribution area, but only rarely seems to appear.

After this undoubtedly exciting and successful search we trek via a narrow track northwards further along the coast. In this way we hope eventually to reach the bay of Cifuncho, which lies some 40-odd km further northwards. On the way we see huge specimens of *Copiapoa columna-alba*. Some plants here attain a height of one metre, which for this sort can be regarded as decidedly exceptional. Some scanty specimens of *Eulychnia saint-pieana* display their very typical short cup-like white flowers. The whole flower sits as it were packed in a thick woolly envelope. Unexpectedly the track dropped down towards the sea and we stand before an abandoned mine. There was no track going any further northwards, so we turned round and retraced our steps, to try our luck south-easterly from El Guanillo. We passed terraces where *C.columna-alba* and *C.longistaminea* grew together. It is a fine sight, the solitary columns of *C.columna-alba* between the huge hummocks of *C.longistaminea*. Once again we pass the Ritter "field" and take at random a track running in a south-easterly direction.



.....from A.W.Craig

During my second visit to Chile in November 1995 I attempted to find *Esmeralda* but by a different route than that taken the previous year when accompanied by a member of CONAF (Corporacion Nacional Forestal) based at Pan de Azucar.

On this occasion we turned west from the Pan-American highway at a sign indicating "Mina Maria".

Along desert tracks with various junctions but no sign posts we navigated only by aiming to reach the coast. We stopped at a point some 7 or 8 km from the coast still in the general surroundings of the coastal hills but in an area of smooth rolling dunes. These were not composed of fine sand but of compacted quartz grit with an average particle size in the region of 4 to 6 mm. It was suspected that the area might be suitable for *Thelecephala* so a start was made to search the ground and some plants were quickly found which were taken to be a small *Copiapoa*.

These heads of these small *Copiapoa* were always flush with the surface of the ground and never protruding above it, often with a layer of grit almost obscuring the head. The heads were up to 40 mm diameter but they were generally smaller, about 25 to 30 mm or less, usually solitary but occasionally up to 3 heads which appeared to be due to the result of damage caused possibly by Guanacos. Attempting to establish the nature of the root system proved to be quite difficult due to the extreme compaction of the grit and the long tap root, often larger in diameter than the head of the plant and having a length of around 300 mm, being connected to the head by a neck of narrow diameter. The volume of the tap root would be many times that of the head, much greater even than that observed on *Copiapoa hypogaea*, *C.mollicula*, etc. The colour of the head was bluish green and due to the dessicated nature of the plants it was difficult to distinguish any rib pattern in the tubercles. There were no indications of any of the plants having recently flowered and also no signs of seed.

From that point we drove further down towards the coast more or less following a dry quebrada towards *Esmeralda* and came within sight of the sea which lay ahead of and below us, possibly a mile away. Stopping at a spot where we could camp, at *Planta Esmeralda*, a short walk down the dry stream bed came to what can best be described as a dry waterfall, a sheer drop of seven to ten meters. In the November of 1996 we adopted to take a different turn off the PanAmerican Highway and approached the coast down the *Quebrada Guanillos* which lies only a few km to the north of *Esmeralda*, confirming the location by G.P.S. From the mouth of the *Quebrada Guanillos* we were even able to drive south along the coast to the mouth of the *Quebrada Esmeralda* (*Cachina* valley) where we came to the base of the dry waterfall which barred our further downstream travel the previous year.

A day or two later we took the trail from *Esmeralda* towards *Pan de Azucar*. In the area of *Las Lomitas*, we found yet another population of small, buried *Copiapoa*, but with even smaller heads - about 25 mm in diameter maximum. These plants were smaller in all respects including the tap root, being a slightly scaled down version of the plants found in *Quebrada Cachina*. Again there was no sign of recent flowering. There were no obvious central spines, but the spines were about 2 mm long on some plants and about 10 mm long on others. Both the populations observed near *Las Lomitas* and when entering *Quebrada Cachina* seemed, in general appearance, to be a possible miniature version of *Copiapoa grandiflora*, which usually grows nearer the coast, above ground, and much better spined. It is unclear whether these plants are stabilised miniature populations or whether they are merely variants arising from the local environment i.e whether they would assume the mode of growth of the above-ground *Copiapoa grandiflora* if they were grown from seed and planted in the coastal conditions. The latter I would doubt, as the plants near *Las Lomitas* are frequently moistened by quite thick coastal mists - trips I have made in this same area have had to be curtailed due to the cloud/fog - and also from the quantity of lichen seen on adjacent plants.

There was no observable cline to be seen between these miniature *Copiapoa* and the larger coastal species/forms of *C.grandiflora* which form hemispherical clusters. These clumps of the larger form of *C.grandiflora* can exceed one metre in diameter, having approximately 100 heads in some extreme cases and with individual heads up to 150 mm in diameter. For the purpose of clarity in correspondence and until further information about these plants is gleaned, the epithet *Copiapoa grandiflora v.minima* might be suitable.

Whilst we were in the *Quebrada Guanillos* we stopped a few km from the shore, close to a conical rocky hill whose flanks rose in irregular steps, ledges, and slopes, with flat or sloping patches of grit. The ascent of the hillside was more of a scramble than a walk. Here again there were to be found small *Copiapoas* with singles and clusters of heads of up to 60 mm in diameter, with a greyish-brown body colour. There were thousands of these plants here. They grew either flush with the surface of the ground or slightly raised above the ground. They appeared to be quite different to the semi-subterranean *Copiapoa* found at *Las Lomitas* and in the *Cachina* valley, in respect of the texture and colour of the epidermis, and also the spination.

.....from H.Middleditch

It is possible that Fig.978 of *Copiapoa esmeraldana* in Ritter's *Kakteen* in *Sudamerika* could pass for a small version of *C.grandiflora*. But the spination in Ritter's description of this species bears little resemblance to that indicated for the three populations of semi-subterranean *Copiapoa* found by A.W.Craig. Perhaps the unidentified *Copiapoa* found in *Quebrada Guanillos* by F.Vandenbroeck also fails to match Ritter's Fig.978 and associated description?

.....from F.Vandenbroeck

When I found this unidentified *Copiapoa*, most plants were hidden under sand or small pebbly stones. On this account I first thought of *Copiapoa hypogaea*, but the aspect of the plants is not like that species. The plants have a pronounced greyish-brown body of 5 to 6 cm in diameter, are clustering, with 12-13 rounded ribs, weakly spined, some indeed without spines, probably due to erosion. Ritter's description of *Copiapoa esmeraldana* hardly seems to fit here. Moreover he states that *C.esmeraldana* occurs on steep cliffs south of

Esmeralda.

.....from A.W.Craig

The unidentified *Copiapoa* found in habitat in the Quebrada Guanillos does not seem to fit either the Ritter description for *Copiapoa esmeraldana* or his photograph Fig.978. However, I have a plant of TJ 74 labelled *C.esmeraldana* from Esmeralda, obtained from T.Jenkins and presumably seed grown. At first sight this has rather more than a passing resemblance to *C.humilis* in one of its many forms. This TJ 74 has some 13 ribs divided into quite prominent well rounded tubercles and a central spine just short of 20mm, although the ribs are more clearly defined on the Ritter Fig.978. Otherwise these unidentified *Copiapoa* from Quebrada Guanillos might possibly adopt the appearance of Ritter Fig.978 or my TJ74 in cultivation.

.....from H.Middleditch

For *Copiapoa esmeraldana*, Ritter quotes a head size of 3.5 to 7 cm., freely offsetting, 13-16 ribs, 6-8 radial spines 5-10 mm long, 3-4 central spines 1-2 cm long; the head size and offsetting quoted by Ritter would appear to accommodate the plants seen by F.Vandenbroeck, whilst the rib count is no great discrepancy. However, the illustration of *C.esmeraldana* Fig. 978 in Ritter's *Kakteen in Sudamerika* gives the impression of a well-spined above-ground plant, not a weakly spined semi-subterranean plant, as described by F.Vandenbroeck and A.W.Craig. In his *Kakteen in Sudamerika*, Ritter does indeed describe the type location for his *Copiapoa esmeraldana* as "steep coast south of Esmeralda". It may also be noted that *C.esmeraldana* is included in the entries against FK 1052 to 1057 which are all from "Las Lomitas on top of bluff"; if this is where the hills rise abruptly from the sloping coast, it may conceivably be described as "steep coast".

.....from A.W Craig

The site where we found the small semi-subterranean *Copiapoa* near Las Lomitas was in typical coastal hills. It would be a walk of roughly 600 metres or so from there to a point where the ground descended sharply to the coast. Although it was not too easy to see the coast itself, on account of the swirling mists down below. From the foot of this steep cliff the beach looked as if it was not very wide and, as usual, appeared to slope gently down to the edge of the sea. This particular vantage point might well be described as "steep cliffs" but I did not see any small, buried, *Copiapoa* at that particular spot.

If F.Vandenbroeck was so fortunate as to find *Thelocephala* in bud, flower, and fruit I wonder what time of year he made that visit?

.....from F.Vandenbroeck

We were in that part of Chile in the November of 1990.

.....from A.W Craig

In approaching the coast near Esmeralda from the Pan-American highway, the road passes through the coastal hills, following the Quebrada Cachina. Some four km or so before reaching Esmeralda, the hills move away from the road both to the left and the right. The road now crosses a broad and almost flat area of sandy ground scattered with *Copiapoa columna-alba*, where there is good regeneration of these plants. This is probably where F.Vandenbroeck was reminded of the Ritter Fig 1094; in that particular picture the camera is probably facing north across the valley as the hills can be seen in the background. A couple of km nearer Esmeralda there are tracks leading off to the south-east so I imagine it was one of these that was taken by F.Vandenbroeck when he drove away from this area.

Esmeralda itself lies perhaps a couple of km from the shore, at a point where the coastal hills rise very abruptly indeed from the ground which slopes gently towards the sea. So steeply, in fact, that there did not appear to me to be any safe way of descending to the beach. At about a km inland from that steep drop there is a track (which may have been followed by F.Vandenbroeck) from La Cachina in the Quebrada Cachina, across a mountain spur to Quebrada Guanillos. From where this track joins the Quebrada Guanillos, it will be about a couple of km nearer the coast when we met with the somewhat swampy patch of ground where some reeds grow; presumably this was the same swampy spot mentioned by F.Vandenbroeck. Shortly afterwards, the guano-covered island does become visible out to sea. Very close to the coast, a short distance to the south of where the Quebrada Guanillos runs out to the sea, we also found what must be fisherman's huts. It rather looks as though the spot at which Vandenbroeck found the *Thelocephala*, the *Copiapoa lauii*, and the unidentified greyish-brown *Copiapoa* in the Quebrada Guanillos is more or less the same place that we stopped and found what was probably the same plant. It thus appears that we found *Thelocephala* AWC 258 and AWC 458 at no great distance from the Vandenbroeck location for the unidentified *Copiapoa*.

The succulent-like convolvulus with the bluish purple flowers seen by F.Vandenbroeck will very likely be a *Nolana*.

.....from H.Middleditch

The Schulz *Copiapoa* book includes a photograph (114) of an isolated hill in the Quebrada Guanillos which is described as a habitat location for *C.longistaminea*, *C.esmeraldana*, *C.grandiflora*, and *C.lauii*. Perhaps this was the same location as that visited by F.Vandenbroeck and by A.W.Craig where the unidentified *Copiapoa* were to be found.

.....from A.W.Craig

Looking at the photograph 114 in the Schulz *Copiapoa* book, taken in the Guanillos valley, I am fairly certain that it is the hill where we stopped and climbed, finding all the plants mentioned by Schulz from there. But we did not find all the plants mentioned by F.Vandenbroeck.

.....from R.Ferryman

We found what is probably this same small *Copiapoa* to the north of Pan de Azucar when I was travelling in company with A.Hoffmann. My travelling companion was quite convinced that what we had found was a *Thelocephala*.

.....from H.Middleditch

There are some quite good illustrations in the Schulz Copiapoa book of plants which may well be this same small Copiapoa, identified there as *C.esmeraldana*. Most of these pictures are of plants which appear to be growing partially or wholly above ground and yet lack the prominent ribs of Ritter's Fig 978 and also lack a strong armament of spines. But the Schulz photo 44 is sufficiently close-up to suggest that it is growing above ground and does bear a closer resemblance to Ritter's Fig 978. However, there appears to be no statement in the Schulz book to the effect that these plants have been found in a virtual subterranean state, nor that rib and spination development is more prominent the more the body is growing above ground.

In many of the Schulz pictures of this plant may be seen the nature of the gritty gravel of which the surrounding surface of the ground is composed; the grit appears to be about 5mm or so in size. On one photograph these plants appear to be growing in ground composed of solid rock patchily covered with what may be merely shallow pockets of grit. On account of the small size of the plant bodies it is not clear if they are growing more or less entirely above ground, as might be expected in such circumstances. Unless the tap root had found a crevice in the rock giving the plant an anchor to draw the head below surface level. It might be surmised that the more or less ribless and spineless plants would be of semi-subterranean growth, in gritty ground, with a substantial tap root, whilst the well ribbed and well-spined plants may be growing overground in rocky ground. However this neat idea is scuppered by picture 70 in the Schulz book of a well-spined plant apparently growing in gritty ground, with a very robust tap root indeed.

.....from A.W.Craig

Even if these plants are growing in relatively shallow pockets of gravel on solid rock, the roots will still find their way down into clefts in the rock. The Schulz photograph 44 does show fairly well defined ribs but these do not give the appearance of being as acute as those to be seen on the Ritter Fig.978. Over the course of the years the body of these plants will contract at ground level in proportion to the new growth so that old spines will accumulate at the rim of the body. This can be seen in the Schulz photo 70 and should not be mistaken for a head that has been growing well above ground level. Nowhere did we see one of these small Copiapoa where the complete head was growing naturally above ground level, the few exceptions being in areas of erosion, for example.

.....from H.Middleditch

For the time being it may be practical to accept the small and mostly semi-subterranean Copiapoa seen by A.W.Craig and by F.Vandenbroeck in Quebrada Guanillos, as well as the Ritter Fig.978, as representatives of the same species of Copiapoa esmeralda illustrated by Schulz. And quite possibly still distinct from the Copiapoa grandiflora v.minima.

## **FINDING WHICH SORT OF TRICHOCEREUS? From G.Charles**

In the autumn of 1995 the possibility was discussed of making a short visit to northern Argentina before the end of that year, culminating in a decision to go for a couple of weeks in early December. On the occasion of our previous visit to this part of the world we had driven quite a considerable distance in order to take in a wide variety of habitat locations - the greatest number we could effectively visit in the time at our disposal. Of necessity, this meant that the time available for looking round at each stopping point was strictly limited. On this occasion however it was the intention to follow a much shorter itinerary with fewer stops, but to spend rather more time at each location in order to have a good look round to see what we could find.

After a trip along the Quebrada del Toro which took us as far as San Antonio de Los Cobres, we went up to the Bolivian border and then returned via the Quebrada Humahuaca. On the way north, we stopped overnight at Humahuaca and during the night it started to rain, the rain soon becoming very heavy and continuing for the whole of the night. When we set off the following morning the ground did not seem very damp, possibly because the rain just soaked straight into it as it had previously been so dry. But a lot of the houses seemed to have suffered from the heavy overnight rain, probably on account of the corrugated iron roofing which does not keep out the heavy rain. Tiled roofs are quite rare here on other than public buildings. Fortunately the river beds remained almost dry so that we had no trouble crossing them on the minor roads. Two days later we decided to take the road from Iturbe over to Iruya. At an earlier Chileans' Weekend we had already heard an account from K.Preston-Mafham of what he had seen on that particular route, whilst some valuable observations had also been provided by M.Nilsson. The contrast between the arid conditions in the Quebrada Humahuaca and the almost lush vegetation around Iruya itself was really quite remarkable.

From the Quebrada Humahuaca we first had to cross the mountain range to the east. Once over the high pass the road started to descend the mountainside; the gradient was moderate to start with but became steeper the further we descended. Because of the mountainous terrain combined with the line of the side valley we were following, we could not even see into the bottom of the main valley below. Finally the road zig-zagged downwards until it reached the floor of the main valley. It was then only a short distance to Iruya itself. The valley bottom was flat, but not very wide, with very steep sides indeed so that the only way in or out of the valley was down one of the side valleys, such as the one we had followed. The valley floor was given over to agriculture which extended to terraces on some of the better slopes. On the lowermost parts of the valley sides there were trees up to 5 metres tall and even more, as well as bushes of lower height, all making it difficult to walk up the steep slopes. In places there were cliffs or very steep rock walls which would need mountaineering techniques to ascend.

On one of these patches of almost vertical rock which we looked at, facing north-east, there were abundant Tillandsias and odd tufts of grass. We could also see there a few specimens of a short, stout,

columnar plant. The bodies would be about 4 or 5 inches in diameter, stems up to about a couple of feet tall. Few of these plants were solitary, these being the shorter and presumably younger ones, most branching from the base, but usually with only three or four stems. There was often one of these stems bent right over and either lying down or hanging down rock face, some of these with the growing point curved back again almost into an upright position. We did not see any open flowers but several of the plants had one or two buds, some of which were long enough to make it evident that we were looking at an *Echinopsis* or *Trichocereus*. Because they were growing on such steep faces it was difficult to get close to many of these plants to take a good photograph. But we did find one which was in bud which we could scramble up close to and photograph. As the afternoon progressed the sky clouded over and we lost no time in retracing our steps back to Iturbe, travelling through thick fog over the pass where there had been sunshine on the outward journey. Sporadic heavy rain hindered our onward journey to La Quiaca.

.....from C.Pugh

The short-columnar *Trichocereus* which we saw at Iruya was all of one metre tall. It was growing on a relatively steep face of rock with quite a lot of loose pieces, so considerable care had to be exercised when scrambling up to get close to this plant. This rock face ran on into a real cliff, which faced more to the NW. There were *Cleistocactus hyalacanthus/jujuyensis* growing on the top lip of the cliff and near the bottom there were *Rebutias* growing in the clefts and cracks.

.....from H.Middleditch

The shorter plants photographed at this site by C.Pugh display straight, quite slender, horn-coloured spines which project outwards from the areole and are of a quite short length (perhaps up to about 2 cm long) so that the spines on one rib do not overlap those on the adjacent ribs. There is overlap only between the uppermost and lowermost spines on adjacent areoles on any one rib. Apart from the very centre of the growing point, the body is quite exposed to view. At a quick glance, the spination seems to be almost insignificant. There is also a photograph taken in the vicinity of Iruya by R.Hillmann, of a fat-stemmed, short-spined *Trichocereus* growing on a steep rock face, branching from the base, with one or two stems hanging downwards. This nicely fits the account by C.Pugh of this plant and its manner of growth.

.....from L.v.d.Hoeven.

When I visited Iruya I came across a *Trichocereus* which is similar to *schickendantzii* or *volcanensis* - from which it differed however in being only solitary and no higher than one foot tall.

.....from C.Pugh

We also saw a few plants of what we take to be *T.schickendantzii* growing on more or less level ground, close to the village of Iruya. There were indeed some solitary plants of the sort of height indicated by L.v.d.Hoeven.

.....from H.Middleditch

At this location near the village of Iruya there have been seen plants of *Trichocereus* with similar looking stems, some of which are growing more or less upright, as well and others with stems hanging down a steep rock face. Now what name do we give to this short columnar *Trichocereus*? There appears to be about half a dozen names to choose from.

### **ECHINOPSIS SCHICKENDANTZII Weber Dictionnaire D'Horticulture Bois I 1893**

From the Republic of Argentina, Tucuman. Stem oblong or cylindrical, height of 15 to 25 cm, up to 6 cm in diameter, light green, offsetting at the base and forming clumps with many heads; 14 to 18 vertical ribs, not quite sharp, not very deep; areoles close together, bare. Spines yellowish, slim, flexible, sharp, 5 to 10 mm long; at first 9 outer and 4 centrals, much later many more. Flower not yet known, bud apical, covered with black wool; fruit edible and pleasant.

.....from A.Berger, Monatsschrift. für Kakteenkunde, 1905

*Echinopsis schickendantzii* Web. was first imported from Schickendantz and the majority of those plants existing in the [Mortola] Garden certainly originate from these first specimens. About the flowers, as well as about their geographic distribution, we can refer to Spegazzini's *Cactacearum Platense Tentamen* under no.42. As I noted recently, I had not seen any flower, but in the meantime a specimen for which I must thank Dr. Weber, has now flowered and I now take the opportunity to put a photograph of this plant before you.

This photograph shows a plant which as far as the habit is concerned, does not agree with the original description i.e. the body is not "slim, columnar, upright, mostly unbranched in cultivation, later however offsetting from the base and forming cushions". My plant is cushion-forming with globular stems; however, I know of individual plants here which conform to the original description and are today 34 cm high. They originate from plants in another Garden on the Riviera, which possess still longer quite *Cereus*-like stems. Most probably they came from the same source as my own plant.

.....from R.Allcock

Regarding the photograph provided by Alwin Berger, the flower does not look white. If it is not white, then why is it *schickendantzii*?

.....from H.Middleditch

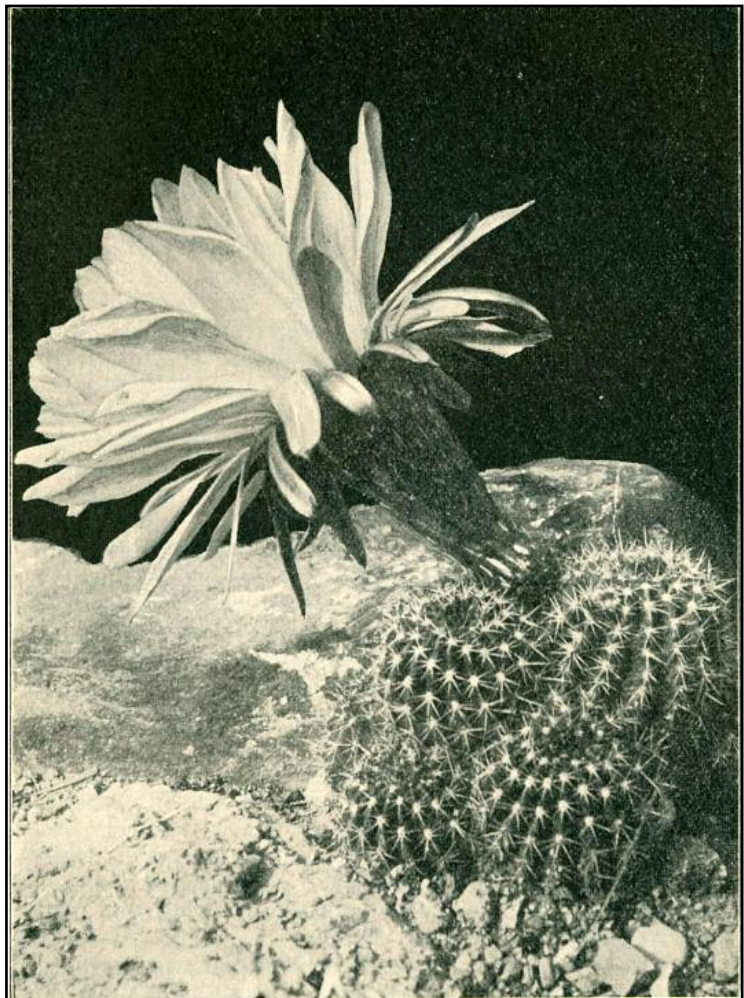
In his article in the 1905 M.f.K., A.Berger describes the flower petals as: "Outermost petals pale green .....; the following ones ..... greenish-white; the inner and the innermost petals ..... all clear white". Presumably it is the greenish colour of the outer petals which conveys the darker colouring which is evident on this photograph. Strictly speaking, the flower is not one hundred per cent white. But that is hardly atypical for many *Trichocereus* or *Echinopsis*.





North of Singuil  
Prov. Catamarca  
Photo: G.Charles

Trichocereus  
schickendantzii



Monatsschrift für  
Kakteenkunde  
1905  
Photo: A.Berger

**TRICHOCEREUS SCHICKENDANTZII (Web) Britton & Rose R.Kiesling,  
Darwiniana, Vol 21, No.2-4, 1978**

Thin roots, just below the surface, very long (up to 3 m). Plants simple or caespitose, in clumps of 1 to 2m. in diameter. Stems cylindrical, upright, up to 60 cm tall, occasionally taller, by 10 to 12 (-15) cm diameter, dark green, matt to glossy green, with growing point slightly depressed. Ribs 11-14, 22 mm high and 35 to 40 mm broad, obtuse, at times somewhat crenate, with a dark intercostal line. Areoles about 10mm apart, nearly round, 8 mm high by 6 mm wide, with abundant greyish-white felted wool. Spines hard, awl-like, sharp, dark yellow, chestnut, and even reddish, centrals 3 or more (in old areoles up to 8) 15 mm long, radials approx. 10, 5 to 12 mm long.

Flowers at the top, nearly apical, 150-180 mm long; pericarpel and part of the tube covered by extended triangular scales of about 10 mm in length; abundant chestnut coloured wool, 10 mm long. Exterior petals thickish, lineal, some 30 mm long, interior petals spatulate, white, 70 mm long and 10 mm wide.

Fruit globular, dehiscent, some 60 mm long and 50 mm diameter, dark green, with white internal wall, sweet. Seeds black, 1.5 mm long, 1 mm high, 0.7 mm thick, glossy, with fine or large pits; hilum oblique, small, with a tendency to point in line with the longitudinal axis of the seed. Embryo slightly curved, short, bulky, about 1.1 mm long and 1mm thick.

Distribution and Ecology. Occupies the humid slopes in the mountains of Tucuman, Salta and Jujuy, between 1500 and 2000 m altitude, at the upper margin of the selva or on rocky gullies within them, accompanied by vegetation predominantly herbaceous and shrubby; at some locations it occurs together with *Cleistocactus hyalacanthus* and *Rebutia* species.

.....from H.Middleditch

The original description of *T.schickendantzii* by Weber has already been reproduced in *Chileans No.39* but is included here again for convenience. Accompanying that reproduction was a commentary abstracted from *Notas Sobre Cactaceas Argentinas* in which Hosseus refers to a plant cultivated in the gardens of La Mortola having "the shape of a cushion of globular stems". When *Chileans No.39* was published there was no apparent connection between *T.schickendantzii* and a "cushion of globular stems" because all comments received at the time from several members growing *T.schickendantzii* only mentioned a plant which grew short columnar. However, in the course of the visit to Argentina by four of our UK members in 1992, a cushion of globular stems bearing a *Trichocereus/Echinopsis* flower was found between Singuil and Buena Vista, near Condor Huasi, north of Catamarca, but still in Catamarca province. Although Kiesling (above) quotes a distribution for *T.schickendantzii* of Tucuman, Salta, and Jujuy provinces, nevertheless he also quotes in the same text a herbarium specimen in Instituto Miguel Lillo, Schreiter 6450, collected in Catamarca province. In the absence of any other relevant data, one is left to assume that Schreiter 6450 may well be in the form of a "cushion of globular stems".

.....from K.Preston-Mafham

I was able to collect quite a lot of seed from the *T.schickendantzii* which grew between Buena Vista and Singuil in the form of a cushion of globular stems. Unfortunately not a single one germinated, an exceptional experience compared to almost all the other seed we collected on that trip.

.....from F.Vandenbroeck

In regard to the area where we found a short-stemmed *Trichocereus* in Catamarca province, which I identified as *T.schickendantzii*. On the road from Concepcion to Andalgalá there is a road junction just south of Bella Vista, which lies on a dry, windy plateau that is called the Campo de Pucara on the map. To the east you can see the heavy cloud banks coming from the moist plains of Tucuman, clinging to the mountain ridges but obviously rarely being able to pass over them. Close to this road junction, *T.schickendantzii* may be found together with *L.crassicaulis* and *Opuntia microdisca*. Very conspicuous and charming were groups of tall white lilies that were flowering abundantly when we were there. There is no possible way to confound *T.schickendantzii* and *L.crassicaulis*. The latter is a much smaller plant, darker green, and has a different spination. I would certainly not describe *T.schickendantzii* as depressed globular, rather as elongated globular, or even as short elongated. Going through my slides I see heads up to 40-50cm tall, although most of them are shorter.

Heading towards Singuil the road descends gradually. Going further along this road in the general direction of Catamarca, the *Lobivia* and *Platyopuntia* disappear. The landscape grows greener; the groups of *Trichocereus* become larger, that is, with wider clumps and more heads. Haciendas with groups of poplars, large meadows and cultivated fields regularly occur. It is in this region that we found the largest groups of *T.schickendantzii*, often with scores of large white flowers. Some rare specimens showed pinkish flowers; one specimen we saw blooming with salmon coloured flowers. Lower down still the country gets even greener with remnants of dense forest in clefts and on the higher crests. The settlements look very indian. Near La Puerta the country gets drier again down to Catamarca.

.....from E.Scholz

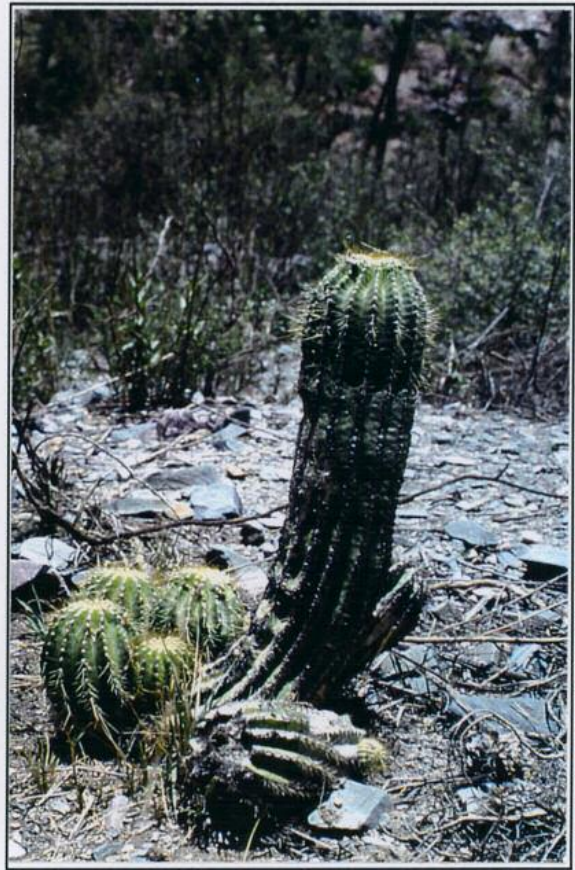
When we travelled from Tucuman to Amaicha del Valle in 1986 we stopped at a point which would be about twelve kilometres south of Tafi del Valle. At an altitude of 1860m near Rio de las Sosas, on a steep hillside in the company of grasses, some species of verbena and a few bushes, but no trees, we came across a fairly small globular plant. It had almost twenty ribs and very short spines. There were several heads together, which were probably one clump. There was a single flower which looked as if it had closed up the previous day, so we knew it was an *Echinopsis* or *Trichocereus*. Later, after we returned home, we were able to determine this plant as *Trichocereus schickendantzii*. We found the same plant again when we stopped there in 1990. Further along the same road, between Tafi del Valle and Abra de Infiernillo, at an altitude of 2670m, we





Duraznos Blancos, Tucuman

Photo: E.Scholz



Iruya

Photo: L.v.d.Hoeven



Iruya

Photo: R.Hillmann



North of Pampa Grande

Photo: G.Neuhuber



came across a somewhat similar looking plant ES 72 which we took to be an *Echinopsis* sp., but now we are satisfied that this, too, was *Trichocereus schickendantzii*.

.....from H.Middleditch

It would appear from the photograph of ES02 in habitat that the plant is growing up against a steep rock face, but possibly not as steep as that described by C.Pugh and with a little more soil immediately next to the plant.

.....from J.Lambert

The picture of ES02 indeed matches fairly well my own specimen from Quebrada del Toro. Perhaps it has a few more ribs - my own plant has only 12. What is characteristic for this species is the short yellowish spines; on my plant the radial spines number 9-11, with only one central.

The picture of ES02 indeed suggests that the plant grows against a big stone, but one should be cautious before calling it a "steep rock face". It is a commonly occurring situation for cacti to grow at the foot of a stone, providing them with some protection; but very often these stones do not exceed a couple of feet in height, even if they are found on an uphill slope.

.....from H.Middleditch

To judge by the length of the unopened flower on the picture of the plant found by E.Scholz to the south of Tafi del Valle, this *Trichocereus* has a main stem perhaps four inches across and eight inches tall, together with two or three heads of similar diameter which are shorter than they are tall. It appears to be of similar appearance to the clumping globular bodied *T.schickendantzii* found and photographed by G.Charles and party between Buena Vista and Singuil.

.....from K.Preston-Mafham

Yes indeed, the stumpy plant pictured by Scholz near El Mollar does look very similar to those we saw to the north of Singuil on the way from Catamarca to Andalgala.

.....from H.Middleditch

As far as I am aware this is the first report of *Trichocereus schickendantzii* having been found in Tucuman province. However, it must not be overlooked that Kiesling does quote references to two herbarium specimens originating from Tucuman province.

.....from R.Kiesling

Yes, indeed, *Trichocereus schickendantzii* does grow round Tafi del Valle. The form which is found there is closer to the cultivated form than the plants found in other populations in Salta. When my paper on *Trichocereus* was in preparation I was not aware of these plants near Tafi del Valle. The reason they are not found by many cactus travellers is that they grow there on rocky patches, which support plenty of grass in summer (the rainy season), and even occasionally in the middle of the forest. In other places, as for example around El Mollar, one is above the forest zone and there is a vegetation of grasses. It has been possible to pay a visit to the Museum of Buenos Aires and look up the location of the herbarium specimen BA 29/44. This was collected by A.Castellanos, 21 July 1929, at Durazos Blancos, on the road to Tafi del Valle. This is a place which I know of, just at the upper border of the tropical forest, where the road from Tucuman to Tafi del Valle passes through the ridge crowned by the Cerro Nunorco. To the north of this ridge the road drops slightly towards El Mollar and Tafi del Valle.

.....from W.Knoll, G.O.K. magazine, June 1974

From Tucuman I took the bus to Tafi del Valle. Soon the omnibus clattered up through the narrow valley of the Rio Angostura. To both sides of the road there was real subtropical rain forest, which stretches along the eastern margin of the Andes in a narrow band. Ever higher we came, until shortly before Tafi del Valle there was no more rain forest. Scarcely had we left the narrow valley than there lay before us a broad high valley, surrounded by areas of scree and almost bare mountains.

.....from G.Charles

In November 1992, after leaving R.Ferryman and K.Preston-Mafham in Salta, C.Pugh and I drove to Amaicha del Valle and then over the Abra Infiernillo en route south. It was getting dark as we passed through Tafi del Valle and not many km further to the south, the road climbs a moderate gradient for a fairly short distance. It then starts to descend again, passing through a very narrow valley, not much wider than the road and the river. Along this stretch we caught a glimpse of something of possible interest so we stopped and I went down the bank and waded across the river to the far side in order to look at a *Trichocereus* with downhanging stems. The perfume from the dozens of flowers was overpowering. Since the stems were very long, more than a metre, I would not think that this was a form of *T.schickendantzii*. There were quite a few trees growing in the immediate vicinity of this location. Whilst I was looking at this plant, C.Pugh had climbed up the hillside on the other side of the road and found another *Trichocereus* there.

.....from C.Pugh

Whilst G.Charles was wading across the river, I took a look up the bank which rose above the other side of the road. This was a hummocky slope with small patches of exposed rock and bits of grass growing here and there. This is where I found what I would regard as a typical habitat form of *T.schickendantzii*, a low-growing multi-headed clump perhaps fifteen inches across. Each of the heads would be three to four inches across. It was rather similar to the plants we found between Singuil and Buena Vista when we were travelling from Catamarca to Andalgala. It was starting to get dark so it was not possible to spend more time scrambling round the slope to find out if there were any more of these plants to be seen. There was certainly a remarkable difference between the low-growing form of the plant which I saw not far off the roadside and that with the long drooping stems seen by G.Charles just on the other side of the river. This may be due to some difference in the nature of the ground or in the orientation.



.....from K.Preston-Mafham

After the other three members of the party returned to England, I continued my travels in order to obtain more photographs of plants in flower. In the course of these travels I went along the same stretch of road near Tafi del Valle where G.Charles and C.Pugh had made a stop. There I found an appreciable number of *T.schickendantzii* in flower, growing on the slope above the river in small open patches between the trees, bushes, and other vegetation - it was all very green. The *T.schickendantzii* had fairly long stems, some standing upright, others hanging downwards close to the sloping ground.

.....from H.Middleditch

The road which runs from Tafi and then through this narrow valley appears from the map to run in a general southward direction here, possibly N by NNW to S by SSE. Several natural history writers appear to have provided an explanation for the one side of the valley being clothed with lush woodland and the other supporting only very low-growing vegetation.

.....from F.Kuhn & G.Rohmeder, Estudio Fisiografico de los Sierras de Tucuman, Univ. Nac. Tucuman, Mon. Inst. Est. Geog., Facultad de Filosofia y Letras, 3.1943

On the Sierra de San Javier one of the characteristic phytogeographic features of the Tucuman sierras may be seen; the preference of the arboreal vegetation for the slopes exposed to the south, while the opposite slopes and the level areas are covered with grasses.

On entering the valley of the Rio Juntas, at approximately 1000 m altitude, the traveller on its northern flank again finds himself in the shade of the large trees of the selva. This quebrada, running more or less in an E to W direction, affords a fine example of the difference in vegetation on the two sides, brought about by the different exposure to humidity. The northern slope, which faces south, is in the more favourable situation. Its slopes display an uninterrupted cover of dense woodland. Along the length of the path may be seen large corpulent laureals, Tipas, and some Nogales, adorned with luxurious epiphytic vegetation. It is the typical selva of the lower zone. Opposite, the southern slope is covered with grassland and only the lateral gulleys are covered with Monte. And this Monte is completely different. It is sparser and consists mainly of Horco-Cebil and Cochuco, among which are some Palos Borrachos (*Chorisia insignis* Knth) and above all many tall cacti (*Cereus* sp.). This contrast between the opposing slopes demonstrates the influence of exposure over the vegetation.

The path which rises over the Cuesta de Las Juntas goes through grassland, but occasionally there is a view of a deep quebrada to the north, which runs in an E to W direction, and on the slope facing south may be observed a dense woodland of Horco Cebil and Cochuco, whilst the opposite slope only carries an open monte of Churqui, Tusca, and cereiform cacti.

In the La Hoyada valley there may again be observed the difference in the vegetation on the two opposite slopes, on account of the WNW - ESE alignment. On the slope which faces SW there is a dense monte of Horco-Cebil, Cochuncho, Sauco, and also Tipa. On the opposite slope there is no monte to be seen in the upper section of the quebrada, only an association of grasses, cerei, and very many bromeliads. Further down, around La Hoyada itself, the woodland appears on this side as well, but always more sparse than on the other side.

The quebrada of Yacuchuyo, running NW-SE, which leads to the heights above Anfama, offers another classic example of the consequence of the different exposure of the slopes. That which faces NE is covered with grasses. The opposite one facing to the SW displays a dense monte of Aliso.

.....from H.Middleditch

The valley of the Rio Junta, as well as those of the Quebrada La Hoyada and the Quebrada Yacuchuyo, all lie between Tafi del Valle and Tucuman city. There are many other valleys on the east facing slopes of the Andes in Tucuman province whose courses run for the large part in the quadrants lying between E to W, through NW to SE, to NNW to SSE. Any difference in the vegetation of the opposing valley slopes is not likely to be confined to these three valleys identified above. The narrow valley downstream of Tafi del Valle which is described independently by R.Kiesling, W.Knoll, E.Scholtz, G.Charles, and C.Pugh, follows the same NNW to SSE direction as the river valley near La Hoyada, mentioned by Kuhn & Rohmeder; hence in both valleys there will very likely be a comparable difference in the vegetation of the opposing slopes. At the stop made by G.Charles and C.Pugh in the valley below Tafi del Valle, if the trees are tall on one side of the valley and virtually non-existent on the other side, it would not be unduly surprising to find *T.schickendantzii* six inches tall on the grassy slope and a yard high on the wooded slope opposite, a couple of stones' throw from each other.

.....from J.Frenguelli. Main Features of the Phytogeography of Argentina, Revista del Museo de La Plata, Botanica, No.13.1940

The subtropical mountain selva occupies the slopes of the mountains and the quebradas, but 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 assymetry and great contrast between the eastern slopes covered with selva and the semiarid western slopes.

.....from H.Middleditch

It is not purely a matter of exposure to the prevailing moisture bearing winds. The slopes which face more to the north are exposed to direct insolation and receive more calories per square metre per hour than the slopes which face more to the south. In consequence the advantageous moisture supply on the southwards facing slopes is brought about by a combination of better precipitation and less evaporation. It is because the south- (or SW-) facing slopes are more advantageously placed on both these accounts that the vegetation can differ so markedly between opposing slopes.

.....from C.Pugh

My recollection would be that the slope on the far side of the river would face west and the bank I climbed would face east.

.....from H.Middleditch

This stopping point noted by G.Charles cannot be any great distance from Durazos Blancos, the Castellanos collection point for *T.schickendantzii*. The *Trichocereus* review by R.Kiesling places this species at the upper margin of the Selva or tropical forest and gives an altitude distribution range of 1500 to 2000m. By comparison, Spegazzini (*Cactacearum Platensium Tentamen* 1905) quotes 1000 to 2500m altitude range for this same species. This leaves the problem of establishing which statements appear to be reliable and which are questionable. The distribution area for *T.schickendantzii* quoted by both Kiesling and Spegazzini includes prov. Jujuy, although there do not appear to be any recorded reports of *T.schickendantzii* from here. But it is possible that the plants we now describe e.g. as *T.volcanensis* from near Volcan, and others, were known to Spegazzini, and were included by him under his name *Echinopsis schickendantzii*. In which event the altitude range of 1000 to 2500 m as stated by Spegazzini would be explained.

.....from R.Hillmann

We found plants of *T.schickendantzii* near Santa Lucia, which is before the real start of the climb from the very foot of the Andes up to Tafi del Valle. There were perhaps only a dozen plants in this small population each forming a cluster of short stems.

.....from H.Middleditch

That is a quite extraordinary report since the 1:250,000 scale map from M.Nilsson gives a spot height of 420m for Santa Lucia. These plants seen by R.Hillmann may grow at a height in excess of 420m in the neighbourhood of Santa Lucia.

.....from R.Hillmann

The spot where we found these plants near Santa Lucia was at 1550m altitude.

.....from H.Middleditch

In Kiesling's review of *Trichocereus*, in addition to the Castellanos herbarium specimen held at Buenos Aires, there are quoted two further herbarium specimens which are held at The Instituto Miguel Lillo at Tucuman. It would be very useful to know the collecting location for these two specimens.

.....from R.Kiesling

You may be able to obtain some information about the collecting location for the two specimens held at Instituto Miguel Lillo from the herbarium curator, Dr. A.M.Tuerpe.

.....from A.M.Tuerpe, Fundacion Miguel Lillo, Tucuman.

The two specimens of *Trichocereus schickendantzii* (Weber) Britton et Rose which are in our herbarium are accompanied by the following data:

Collection: Schreiter 6450 on 3. XI.1930. at 1600 m altitude, in Prov. Catamarca, dept. Andalgala, at El Suncho. Herbarium reference number 667667. Notes - white flower

Collection; Schreiter 9742 on XI.1930. at 1500 m altitude in Prov. Tucuman, dept. Trancas, at San Pedro de Colalao. Herbarium reference number 50584.

.....from H.Middleditch

Unfortunately the Argentine Automobile club maps of Tucuman and of Catamarca provinces does not appear to include a place name of El Suncho, which presumably will be in the general area of the Campo Pucara, close to the border of these two provinces.

.....from M.Nilsson

There is no place name of El Suncho on my 1:500,000 scale map of that area.

.....from The Secretary, The Royal Geographic Society

There is an article by C. & M.S. de Romana entitled "El Valle de Suncho, al Pie de Los Nevados del Aconquija" in the Revista Geografica Americana No.143, XII, 1945. A copy is enclosed for your reference.

.....from H.Middleditch

This article by de Romana includes a sketch map which identifies the Suncho valley in which flows the river draining the Campo Pucara. No actual place name of El Suncho appears either on this sketch map or in the text. The road from Concepcion to Andalgala follows this valley for some distance southwards, then passes through Buena Vista. It was south of that spot where K.Preston-Mafham et al came across some clumping depressed globular plants of *T.schickendantzii*; hence it might be reasonable to presume that the Schreiter 6450 was found a few km to the north of Buena Vista.

The Schreiter 9742 found at San Pedro de Colalao at 1500 m comes from a river valley running up into the Andes, which lies to the north of Tucuman city. At this location the *T.schickendantzii* would probably be growing under generally similar conditions to the ES 02 found at 1860 m altitude near El Mollar. Both these locations are named on the Chileans' map of north Tucuman.

.....from R.Hillmann

Further up the Rio Tacanas from San Pedro de Colalao, near Hualinchay, I came across some short columnar *Trichocereus* RH 1188 which would probably be *T.schickendantzii*. It was growing in company with *Rebutia minuscula*.

.....from H.Middleditch

A slide of this particular plant was shown by R.Hillmann to our 1996 Chileans' Weekend. It seemed to be a solitary youngish plant, rather less stout for its height than might have been expected for a young *T.schickendantzii*.

.....from R.Hillmann

Higher up the valley of the R.Tacanas than the site RH 1188, there are *T.schickendantzii* which form flat

clumps of heads, rather similar to those on the picture of ES 02 from El Mollar.

.....from G.Neuhuber

On the road from Guachipas to Pampa Grande at GN 88/64 is the area where the red flowering *Parodia guachipasana* Wesk. was found. There are two *Echinopsis* to be found here, both *E.ancistrophora* and another *Echinopsis*. You will see from the photograph that this plant is growing on a very steep piece of ground in the company of other herbs and bushes, It produces branches from the base which stand upright at first but eventually hang down the slope, These stems are curved so that the top of the stem is growing upwards even though the stem is hanging downwards.

.....from H.Middleditch

The plant in this photograph from G.Neuhuber appears to be of a similar overall appearance in regard to stem thickness, rib count, and shortness of spines, and is growing in a similar manner, to that pictured by L.v.d.Hoeven at Iruya and also to the plant described by G.Charles from near Duraznos Blancos.

.....from R.Hillmann

In addition to the short, stumpy plants of *T.schickendantzii* seen above Hualinchay, there were also forms which were similar to the plants shown in the picture from Guachipas taken by G.Neuhuber.

.....from H.Middleditch

This variation in form noted by R.Hillmann appears to be similar to the variation in form noted by C.Pugh and G.Charles along the main road south of Tafi del Valle.

There are also reports of *T.schickendantzii* being found in the lower section of the Quebrada del Toro.

.....from J.Lambert

The *Trichocereus schickendantzii* which I found in the lower reaches of the Quebrada del Toro were only young plants, solitary, of no great height at all. They were growing right at the beginning of the Quebrada near El Mollar, i.e. very close to Campo Quijano and the forest. Kiesling writes that this species occurs "at the upper margin of the selva, on rocky cliffs ..... with accompanying vegetation predominantly herbaceous and shrubby; at some spots it occurs together with *Cleistocactus hyalacanthus* and a *Rebutia* sp." This situation exactly matches the biotype at this location - to quote my note book: "Rocky cliff, scarce bushes, herbs, cushion-forming plants, *Cleistocactus hyalacanthus*, *Rebutia xanthocarpa*, *Opuntia* sp."

The picture of ES02 indeed matches fairly well my own specimen from Quebrada del Toro. Perhaps it has a few more ribs - my own plant has only 12. What is characteristic for this species is the short yellowish spines; on my plant the radial spines number 9-11, with only one central.

.....from K.Preston-Mafham

The *Trichocereus schickendantzii* which we saw in the lower part of the Quebrada del Toro were only solitary plants, mostly up to around two feet tall, but one or two were about three to four feet high.

.....from M.Muse

My five forms of *Trichocereus schickendantzii* are clearly expressions of a single species, the matt epidermis ranging from the grey green of PM 318 from the Quebrada del Toro to the grass green of DJF 295.

.....from H.Middleditch

It is of interest to note that the specific association of *Trichocereus schickendantzii* with *Cleistocactus* and *Rebutia*, as noted by Kiesling, was observed by J.Lambert in the Quebrada del Toro, and also by C.Pugh (above) at Iruya.

Now that we have the benefit of all the foregoing reports of various forms of *Trichocereus schickendantzii* seen in habitat, it may be advisable to compare that range of variation with other names such as *T.shoferi*, *T.volcanensis*, and *T.tenuispinus*.

## **NOTOCACTUS SUBMAMMULOSUS WITH RED FLOWERS By H.Amerhauser.**

**Translated by H.Middleditch from Internoto 12 (3) 1991.**

The meeting of the *Gymnocalycium* friends in Karlsruhe-Durlach in the spring of 1989 was a fortunate opportunity for *Notocactophiles* to become acquainted with the distribution of *Gymnocalycium* through the lectures given there. Of course there were also some amateurs who have an interest in both genera. In the countries of Uruguay, Argentina, Paraguay and the southern states of Brazil, both *Notocacti* and *Gymnocalycium* grow side by side, as is well known. Whilst in Rio Grande do Sul and in Uruguay, the *Notocacti* are indeed to be found in many species, the situation in Argentina and Paraguay is quite different. In Argentina is to be found in reality only *Notocactus submammulosus*, *N.sessiliflorus* (Hook) Krainz and occasionally *N. ottonis* (Lehm) Berger ex Backeberg. For example in the course of the reports presented at Karlsruhe-Durlach, there was frequently dropped the phrase "at this location there were unfortunately only large forms of *Notocactus submammulosus*" which put a grimace on the faces of the "only" *Notocactophiles*. In addition one learnt that after D.v.Vliet, scarcely one other collector brought back voucher specimens of this well spined representative to Europe. Indeed one has now and then been able to see photographs of especially strongly spined forms, but propagations from them are not very widely distributed.

However we can report to the *Notocactophiles* about a red flowering *N.submammulosus*. This author now has something more to report about it, since I have been regarded as a "bad correspondent" by some contacts who have approached me on this subject. This with a view to a possible revenge for the *Gymnocalycium*, which were often regarded disdainfully by the *Notocactophiles* just like we did with the abundantly occurring plants of *N.sessiliflorus* and *N.submammulosus*. If you have an opportunity at any time, be it in Rio Grande do Sul or neighbouring countries, to travel on the search for *Notocactus* as well as *Gymnocalycium*, then please do not neglect to take an extra pair of slides for us and perhaps also to bring back

seed.

In one letter it was mentioned that one Knotich of Pforzheim imagined that a red flowering *Notocactus* to have been hybridised by pollinating a *Notocactus* with *Lobivia*. In my opinion it is a mistake to give credit to that possibility, because I contend that these two genera will not hybridise between one another. That view is based upon the very different seed groups. Possibly Knotich has been anticipated by an insect and has perhaps had it crossed with a red *Parodia*.

The discovery of our red-flowering *Notocactus submammulosus* was a real piece of good luck. We were on the route from Catamarca towards Ancasti and searched the area for various *Gymnocalycium* and their accompanying plants. We were able to find *G.baldianum*, a *Gymnocalycium* species, a red flowering *Helianthocereus*, *Parodia*, and *N.submammulosus*. Here we always took specimens of the plants accompanying the *Gymnocalycium* in smaller number, so the new discovery was secured - only we did not know this in 1988 or 1989.

When the first flowers appeared the surprise was very great. A pair of the *Notocactus* flowered their usual yellow, another however bright red. What was left was for us, on our last trip in 1990, to search the habitat location yet once again and to put it meticulously under the magnifying glass. We crawled around, almost with our noses to the ground. After a long search we were able to find these plants once again. The land is a stony slope facing to the east, with low-growing grasses and covered with scattered bushes of pampas grass. We paid particular attention then to distinguish differences between the habitat plants since the plants grew abundantly and had really only small buds in the initial state of growth. We established that one sort possessed pale yellow spines and the other sort had slightly reddish coloured spines as well as a darker epidermis.

If you now believe that our red flowering *N.submammulosus* is a natural hybrid between *Parodia* and a yellow flowering *N.submammulosus*, because they are growing at the same location, then I must inform you that this is not possible, since both plants do not flower at the same time. The photographs of the buds show us the normal yellow form of the *N.submammulosus* as well as those with red flowers, whose buds have long dark bristles.

.....R.Kiesling US C&S J Vol.67 1995

*Notocactus* [*Parodia*] *submammulosus v.minor* Kiesling .... Flowers ... very light yellow (rarely red).  
Type location - Dept. Ancasti, west of Ancasti, collected November 1983.

.....from W-R Abraham, *Internoto* 16 (3) 1995 (Abridged).

The classification under *Parodia* follows the I.o.S. proposals which - very rightly in my opinion - are regarded as highly controversial. In this review by Kiesling is a first description of a plant well known for quite some time in our collections. It is "*Parodia*" *submammulosus* (Lem) R.Kiesling *v. minor*, better known to us as *Notocactus* sp. Ancasti and in my understanding was first collected under the number Lau 502. This classification in the genus *Parodia* can not be accepted and the following recombination is necessary: *Notocactus submammulosus v. minor* (R.Kiesling) W.R.Abraham comb.nov.

### **THE RED FLOWERING NOTOCACTUS SUBMAMMULOSUS. By R.Havlicek Translated by H.Middleditch from Internoto 17 (2) 1996**

On the occasion of the meeting of cactus growers in Kromeriz in August 1995 we were able to put some questions to F.Strigl concerning *Notocactus submammulosus v.minor*. Since he had visited the habitat locations of this variety - STO 270, STO 372, and STO 272 - his answers to our questions about relationships in habitat brought to light some new data.

After the first *Notocactus submammulosus v.minor* with both red and yellow flowers had been found, later searches were made to find these plants so that in the meanwhile the three habitat locations which lie in the Sierra Ancasti have become known. The yellow- and red-flowering plants are readily distinguishable even when out of flower, since the red flowering form of *v.minor* have darker spines and stronger radial spines than the yellow-flowering form.

In addition a different flower opening time has been observed in cultivation in the Gerloff collection between the plants of the two flower colours. Whilst the red flowering *v.minor* opens at about 11.30 a.m., the yellow flowering form starts to open at about 12.30. Around about one to two hours later the red flowers close up again. Thus the flower opening times only overlap by about two hours in cultivation. For that reason one can readily accept the observation by F.Strigl that the two flowering forms can only rarely become cross-pollinated in the wild.

In the vicinity of the red-flowering *N.submammulosus v.minor* there was found *Parodia malyana* Rausch, which is also red flowering. This *Parodia* grows cylindrical up to 12 cm tall. The 4 cm diameter flowers are usually pinkish yellow to pinkish-orange, occasionally even yellow. It grows at 1000m at STO 472.

In addition the following observations can be made in regard to the red flowering *N.submammulosus v.minor*. The plants have no viable pollen. Cross pollination of red flowering plants seldom yields fruit, which do not hold any seed. If red and yellow flowering plants are cross pollinated, the resultant fruit does contain seed. The ripe fruit is but 15mm long at the most, the seed being only half as large as normal.

Finally it is to be noted that in my own view the differences presented here between the red flowering and yellow flowering plants of *v.minor* would have merited far greater attention in the original description by R.Kiesling, than to be merely referred to by the observation "*Flowers ... very light yellow (nearly red) tepals*".

.....from N.Gerloff

In August I was able to pay a visit to H.Amerhauser at Eugendorf in Austria. Here I was able to identify one or two *Notocacti* for him. He had also been propagating the red-flowering *N.submammulosus*. Just like I

did, he pollinated the plants last year only from the yellows from the same location, STO 372. He also seemed to have obtained ten percent with yellow flowers.

.....from H.Middleditch

Reports of *Notocactus submammulosus* from Sierra Ancasti appear to be confined to the central area e.g. LB 1211 Anquincilla, LB 1215 El Taco. The question arises whether the red-flowering version is also to be found in this same area or from another part of the Sierra Ancasti.

.....from L.Bercht

You can find *N.submammulosus* at several places on the Sierra Ancasti. The Austrians have found some red flowering plants in between the top of the Cuesta Portezuelo and Anquincilla. *Gymnocalycium baldianum*, flowering from pink to red, is to be found growing widely over the Sierra Ancasti. Up to a certain altitude there grows *Lobivia aurea* and above that level *Lobivia dobeana*, whilst some 6 km to the south of Casa Amada the yellow flowering *aurea* and the red flowering *dobeana* are to be found growing very close to each other. Similarly *Parodia microsperma* flowers yellow below about 1500m and above 1500m it flowers red = *Parodia malyana*.

.....from A.Hofacker

The red flowering *N.submammulosus* were found at STO 270 and STO 372 south of Las Morteros.

.....from H.Middleditch

Which puts the red-flowering *N.submammulosus* in the same area as the other reported locations for this species.

### **GYMNOCALYCIUM BALDIANUM v. ALBIFLORUM By L.Bercht Translated by H.Middleditch from *Gymnos* 11 (21), 1994**

For my second trip to Argentina in December 1992 I had planned to traverse many stretches of southern and eastern Catamarca. Only the name Ancasti was known to me in connection with *G.baldianum*. I preferred not to have prior knowledge of the finds of other field-workers, because then one travels with a restricted outlook.

On 17 December we started off from Banado d'Ovanta early in the morning. We covered a distance along the road to La Merced in thick moist fog. Cacti were not to be seen. We were quite satisfied to be able to continue along the road. After we had passed La Merced the weather brightened up and we could enjoy huge *Cerei* in full bloom. In the midst of them we also found *Cleistocactus smaragdiflorus* (Web) Br.& R. and other creeping *Cerei*. Shortly before the turn to Cuesta El Portezuelo we came upon a police control.

From the map of Catamarca it is not easy to see that the ascent of the Cuesta, with its numerous bends, is 17km long. During the ascent we saw many large specimens of *Gymnocalycium nigriareolatum* Bckbg., also *Parodia* perched on steep cliffs, as well as *Lobivia*. Here and there stood fantastically magnificent *Chlorisia insignis* HBK. Right on top, where the landscape transformed into hilly meadows, we find the first *G.baldianum*. It grows there in open, rocky places in the midst of meadow or on a ledge of rock. We have the good fortune to be there just when many plants were coming into flower. The glossy red buds and unfolding flowers pointed unmistakably to *G.baldianum*. Between Ancasti and El Alto we find many additional populations. Certainly the much paler flowers of the plants around Anquincilla attracted attention. Most of the plants rose only a few cm up out of the ground, but others were quite flattened.

After an overnight stop in Ancasti we drove off the next morning in a S.E. direction. The altitude reduced and we no longer found *G.baldianum*. Once we came above 900m again, we found new populations of *G.baldianum*. Around noon we passed through El Alto. North of the town *Acanthocalycium spiniflorum* v. *macrantha* Rausch was found, growing on a steep slope of slaty rock. The *Parodias* growing there displayed orange coloured flowers. Somewhat further to the north we found a pale pink flowering *G.baldianum* but right alongside them we also found white flowers. Without these flowers we would probably have taken the clump to be a normal *G.baldianum*. At this moment we were delighted with this discovery - a white flowering *G.baldianum*. Closer inspection proved to us that the flower had a red throat.

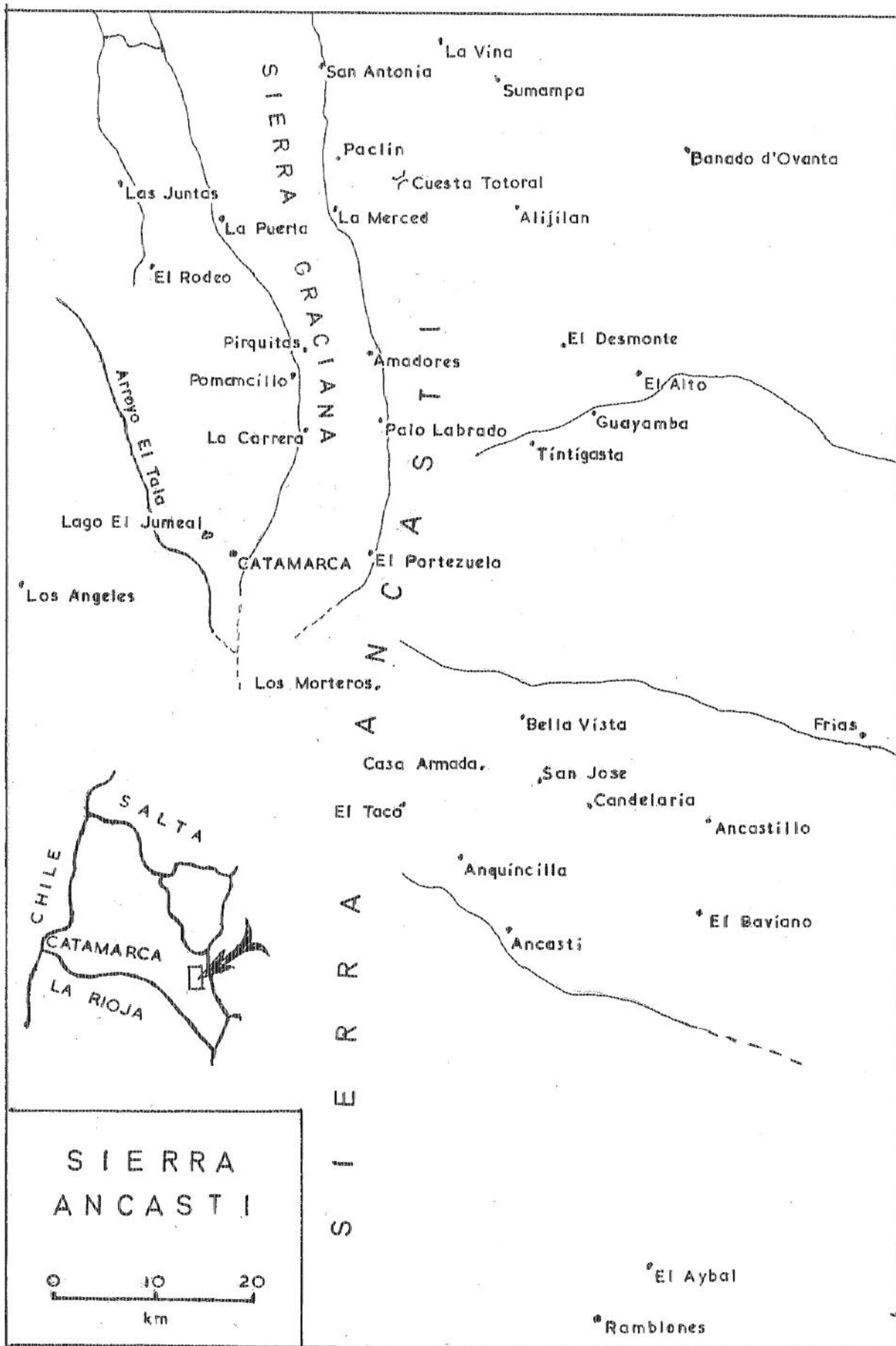
On our further travels we again found red flowering *Gymnocalycium* of the *Baldiana* series to the south of Balcosna at 1150 m altitude. This mountain ridge lies to the north of the Sierra Graciana where - as we first discovered when back at home - *G. baldianum* had likewise been found, as well as further to the west at El Rodeo. A typical characteristic was the somewhat outstanding, pointed, spines.

As we followed the road from Concepcion in Tucuman in the direction of Andalgala, we saw hills in the vicinity of El Alamito and Buena Vista which looked as if cacti should occur there. In fact we found small globular *Gymnos* with outstanding, stiff and pointed spines. No flowers were to be seen. These plants are quite unknown to me. We were quite astonished by the red flowering plants with them. Without flowers they were almost indistinguishable from the others, but when they were handled, the difference could immediately be felt. Although the plants bore stiff spines, these did not prick. All the *Gymnocalycium baldianum* found here were small, up to 3 cm in diameter. The other *Gymnos* here were much larger. The altitude was noted as 1600m.

Prior to reaching Andalgala, the road at first rises and then goes downhill in numerous bends. At 1800m altitude we found a more or less level patch close to some shade-giving trees. Here we found some very fine plants of *G.hybopleurum* (K.Sch.) Backbg., level with the ground, *Opuntia*, *Lobivia*, and red flowering plants of *G.baldianum*, once again likewise completely level with the surface of the ground.

The white-flowering plants from north of El Alto can be regarded as a good variety, and should be described here as a new variety - *Gymnocalycium baldianum* (Speg) v. *albiflorum* Bercht sp.nov.





[This article is also concerned with the synonymy of *G.baldianum*, *G.venturianum*, and *G.sanguiniflorum*; this subject was reviewed independently in Chileans No.50 ]

.....from H.Middleditch

It would appear from this article that very few plants of the white-flowering *G.baldianum* were found, so it is not impossible that it is a sport occurring in rather limited numbers. If plants had been collected here out of the flowering season, the collector may not have been aware that he was harvesting a novelty. But it may help to explain how white flowering *G.baldianum* have been reported previously in cultivation. In just the same way it appears that *G.oenanthemum* appeared out of a batch of imported *G.kurtzianum* without the collector being aware of their novelty value.

From the foregoing account by L.Bercht it appears that it was on the way down to Andalgalá from the Cuesta Chilca that the author again found plants of *G.baldianum*. This is the first time that I am aware of this species being reported from the western slope of the Sierra Ambato.

.....from W.Clarke

The plants of *G.baldianum* which I have vary greatly in flower colour from deep red through pale red to almost pink. Perhaps some are hybrids.

.....from H.Middleditch

What is rather more likely is that this range of flower colour is representative of the flower colours to be found in habitat, if we are to accept the observations made by Markus & Rausch (Chileans No.50 p.96) viz: "There was *Gymnocalycium* with blood-red flower colour, then again in paler red, some with pink flowers, and finally even white flowered plants".

.....from G.Charles

On our trip to north-west Argentina in 1992 we were able to stop at Catamarca for a couple of nights and explore along the roads running into the mountains from there. One of these trips took us almost as far as Singuil, where we stopped at 1300m altitude in the midst of a grassy, hilly terrain with outcrops of rock here and there. We found a *Gymnocalycium* in some numbers and from the red flower together with the appearance of the plants we took it to be *G. baldianum*. There were also ripe fruit on some of these plants which enabled us to collect seed for sowing when we got back home. By 1996 quite a few of the resulting seedlings had flowered, producing flower colours which ranged from almost crimson through reddish pink to pale pink.

.....from H.Middleditch

The above account by L.Bercht gives the location of *G.baldianum* v.*albiflorum* as to the north of El Alto, whilst the L.Bercht field list gives the location a little more precisely as El Desmonte, between 1150 and 1260m altitude. It is noted that *G.baldianum* v.*albiflorum* JL 405 was found en route from Alijilana to El Alto, which is effectively the same locality as the discovery by L.Bercht.

.....from J.Lambert

During my recent trip to Argentina, we took a track which leads from Los Altos to El Alto. It can hardly be called a road, and poses some real problems for the driver. Along this route we met with fairly large populations of the white flowering *Gymnocalycium baldianum* v.*albiflorum*. This plant grows not far from *Lobivia grandiflora* v.*minuta*, although the *Gymno* actually growing alongside these particular *Lobivia* displayed pink flowers, rather than white ones. This *Lobivia* formed big clumps consisting of numerous small heads, which remained shorter than the typical form. Up to the present time I have not been able to observe the flower of this variety. The main difference in the biotype of these varieties lies in the altitude, which is only around 1000 to 1100 metres, whereas it is 1700m for the typical forms.

From the top of the Cuesta de Portezuelo we took the road to the south in the direction of Ancasti, turning off along the road which leads to Infanzon and Frias. We would be about 8 km south east of the Cuesta de Portezuelo when we came across *Lobivia dobeana*.

.....from L.Bercht (at The Chileans' Weekend)

Near Ancasti we found *G.baldianum* both with deep red flowers and also with a very pale pink flower and a very long, thin, tube. The *baldianum* v.*albiflorum* has a very long tube indeed, but it is as long as the long tubed, red flowered, *baldianum*. After seeing the *Acanthocalycium spiniflorum* to the north of El Alto, then further to the north we saw *G.baldianum* in flower with more petals than the usual *baldianum*; in this respect it was half way to v.*albiflorum*.

.....from H.Middleditch

It is most interesting to see that in the Sierra Ancasti, L.Bercht also came across *Acanthocalycium* of *spiniflorum* affinity at four different locations. those of Ramblones, Candelaria, and El Alto can be located with little problem. But the "Ruta 42" location is not at all clear; between the Cuesta Portezuelo and El Alto, perhaps?

.....from L.Bercht

The Ruta 42 from El Alto crosses the head of the Cuesta Portezuelo and continues southwards towards Las Morteros. The *Acanthocalycium* LB 1221 was found roughly half way between the head of the Cuesta Portezuelo and the turn off to Ruta 11, that is about 4 km south of Cuesta Portezuelo. It was growing in company with a *Parodia*, which may be *P.malyana*.

.....from H.Middleditch

The Sierra Ancasti is the most northwesterly location for any *Notocactus* and it is now evident that it is also the most northwesterly location for the group of *Acanthocalycium* which are to be found in the Sierra Cordoba. This last observation by L.Bercht makes it quite clear that there is a geographical overlap between these *Acanthocalycium* and *Parodia*, although of somewhat limited extent

## CEPHALOCEREUS GUENTHERI By W.Kupper

Translated by H.Middleditch from *Monatsschrift der Deutschen Kakteen Gess.* 1931

With this new *Cephalocereus* can I now once again bring before cactophiles an outstanding discovery of the geographer and botanist C.Troll, who came upon it in the course of his explorations through Bolivia. He himself writes about it as follows:-

“In the course of my exploratory trips through the mountains of Bolivia, I had returned in December 1927 to the mountainous region of Chuquisaca after a five month trip through the Chaco. It was not the intention to discover a new *Cereus*, or the desire to make the acquaintance of the unhealthy tropical valley section of the Rio Grande, which recently directed my footsteps in the direction of the mountain border, but the necessity to cross the Rio Grande before the immediately impending rainy season. All the rivers flowing out of the Bolivian highlands which run towards the eastern lowlands, cut extraordinarily deep canyons through the extensive frontal ranges between the highland and the eastern forelands, likewise the Rio Grande, the southernmost tributary to the Amazon river system.

In these valleys the rivers, before reaching the moist forest landscapes of the front ranges, have to flow through an especially arid section of the valley, in which a particularly interesting xerophytic flora is widespread. It is to some extent comparable with the dry forests of the character of the Brazilian caatingas, and to some extent with a half-desert in which predominantly cacti and bromeliads thrive. Only in one of these valleys, the Rio Grande valley, have I met with *Cereus guentheri* at an altitude of 800-1100m. It is the only *Cephalocereus* which is known to me in Bolivia and indeed the most southerly one in the Andes. Its habitat however appears to be very restricted in this valley system of the Rio Grande. Downstream from the finding place the character of the valley changes completely and its distribution does not even appear to extend upstream, although the arid character of the valley system continues deep into the mountains. Even in a nearby side valley, of the self-same overall vegetation character and otherwise quite corresponding cactus flora, there was not a single specimen of *Cephalocereus guentheri* to be seen. In view of its such conspicuous appearance, it would not be possible to overlook it. Its trademark is the reddish brown coloured cephalium which either runs down from the growing point in long furrows for up to half a metre or forms shorter tufts of wool”.

The columnar cactus discovered by Troll is really a true *Cephalocereus* in the Schumann sense. I am able to convince myself of that with a top cutting, which he sent to the Munich Botanic Garden, portrayed almost natural size in the accompanying illustration [in M.f.K.] That cutting carried a fine cephalium. Unfortunately it did not retain a hold on life, but it put out a flower despite being without roots. The mummy of the dead top cutting enabled it to be established that within the cephalium formation, the areoles are so greatly enlarged that they stand crowded together with no gap between each other and clearly form a double overlapping inclined furrow system. Nevertheless the whole is clearly arranged in line with the ribs. These are so low, however, that in the living specimen they would scarcely be recognised as such; in this instance however they are easily recognisable as longitudinal lines in the epidermis, separated from one another. Also one cannot very well speak here of the complete disappearance of the ribs or of their resolution into tubercles as has been established in other instances. I must therefore air the supposition that there is probably after all no sharp dividing line between those *Cereus* with a true cephalium and those with a pseudocephalium, but that here, too, as so often in Nature, transitions occur.

Now follows the description of this new species. I have named it after E.Guenther of Valparaiso, who as a well known enthusiast of Botany has provided significant financial support for the expedition undertaken by Troll in Bolivia.

*A basi ramosus, ramis erectis columnaribus, costis usque ad 27 et ultra humilibus rotundatis leviter crenatis, areolis approximatis tomentosus, aculeis 15-25 et ultra acicularibus vel setiformis, cephalio laterali denso setoso, flore campanulato-infundibuliformis extus squamoso et dense lanuginoso.*

The growth is columnar, branching from the base. The individual stems attain about 2m in height by about 10cm in diameter. The number of ribs averages about 27, they are roughly 1 cm wide and 5-7 mm high, rounded at first, slightly tuberculate and display a slight (often indistinct) cross-groove above the areoles. These are small, round or somewhat elongate, about 5mm long, bearing short yellowish-white wool and stand at about 1 cm (or less) apart. These have about 15 (in the vicinity of the cephalium 25) straight spines of 15 to 5 mm in length. Those upwardly directed are shorter and stronger, needle-like, those downwardly directed are more numerous, longer and thinner, even bristle-like. A distinction between central and radial spines is not discernible, unless one central spine attracts attention one account of its length (up to 22mm) and robustness, as well as its dark brown colour.

The cephalium is developed at one side, up to 50 cm long but mostly much shorter, reddish brown to whitish, with a silken gloss. Otherwise the the spination of the plant is a dark honey-yellow, somewhat like that of *Echinocactus leninghausii*. The areoles of the cephalium bear thick tufts of yellowish white wool of 3-4 mm in length and from these project the very numerous up to 4-6 cm long bristles or transformed spines, over 100 to each areole. Flowers arise only from the cephalium and protrude from it but little. Length 8 cm, tubular-bell shape in form, opening only 2.5 to 3 cm wide; pericarpel and flower tube clothed from the base upwards with with pale greenish-yellow, narrowly triangular scales with browner tips and thickly covered with pale pink coloured silken wool, which arises from the axils of the scales in long locks. Scales at the base of the flower 5-6 mm long, very narrow and pointed, becoming 10mm long and 3 mm broad above where they change into the ca. 13 mm long and 5-6 mm broad tongue-shaped petals with yellowish white inners and tinged pale pink externally. Ovary as wide as high, filled with funicles with bush-like branches. Stamens arising from the inner wall of the tube, the uppermost inserted at the base of the petals and only still about 5mm long; anthers pale pink. Style white, 1.5 mm thick, rising about 1.5 cm above the flower tube. Stigma

lobes yellowish, 4-5 mm long, numerous (on the flower in question, 18). Flower only opening at night. The native name for the plant is Keweillu antojchupa.

.....from M. Cardenas, autobiography

In the February of 1949, I took myself by train to Potosi accompanied by A. Uzeda, an ex-student of mine from the Instituto Normal Superior La Paz and at that time Professor of Botany at the Agronomic faculty. In Potosi, we collected various cacti along the stretch to Miraflores, and especially *Oreocereus celsianus*, *Echinopsis longispina*, *Lobivia hardeniana*, *Opuntia weingartiana*, etc. From Potosi we continued to Sucre from where our goal was the Rio Grande, in order to photograph and collect the curious columnar cactus *Vatricania guentheri*, described years ago by Prof. Troll. We spent a day in Sucre procuring a vehicle as far as Villa Serrano in the province of Boeto. The agent for the agricultural ministry, A. Sanjines, furnished us with a truck and attached to our party E. Rellini, an ex-student of mine from the Agronomic Faculty of Cochabamba.

On the first day we travelled as far as Tomina, always collecting the predominant flora on this stretch.

On the following day we arrived at Villa Serrano, where we were informed that in order to get to the area where *Vatricania* grew, on the descent to the Rio Grande, would take a further two days of travel on horseback via El Aserradero, situated beyond Nuevo Mundo. We decided to make this journey on foot, in four days. Unfortunately the vehicle driver did not have permission to delay his return to Sucre for this period of time so we were frustrated in our wish to reach the area of this rare cactus.

We commissioned a resident of Serrano that when he went down to El Aserrado, where he worked, to send to us a limb from the plant which in this area is known under the name of "cola de zorro" [fox tail] and to send it to A. Sanjines in Sucre. Some months afterwards, we received in Cochabamba a crate with two terminal offcuts from this cactus, provided with their lateral cephalium formed of brown bristles and a dried flower in the middle of that.

In March of 1955 we made preparations at the La Tamborada station for a trip to collect wild potatoes in the Valle Grande province of Dept. Santa Cruz. We travelled in a jeep, Gandarillas, Spiaggi, Candia and I. Gandarillas was co-director of La Tamborada, Spiaggi a technician in forage plants at the same station and Candia was an agronomist recently returned to this country from two years detachment in Mexico as a Rockefeller Foundation student. We started our collecting at km 140 along the road to Santa Cruz, where among various bushes and spherical cacti we came across *Solanum aslandiae*. We continued along the main road .... over the pass of Siberia to Torrecillas .... then went down to Comarapa .... and Mataral. From there the road to Valle Grande was quite narrow and not asphalted.

All the following day was occupied looking for mules and horses in order to reach as far as the Rio Grande because there was no road beyond Candelaria, 5 km further on. This was Holy week and several flour merchants from Pucara were going to Valle Grande carrying wheat flour on lean ponies. I had a particular interest in this columnar cactus, known under the native name of Cola de zorro and which had been described as *Cephalocereus guentheri* on the basis of the specimens which were collected by the German geographer C. Troll in the course of his journey from Sucre to Vallegrande, crossing the Rio Grande in 1927.

In fact, D'Orbigny was the first naturalist to observe this curious cactus on the slopes of the side of Chuquisaca, in the course of his remarkable voyage in the middle of the rainy season, from Valle Grande to Pescado (Villa Serrano), crossing many fords of the Rio Grande by mule, as may be read in his most interesting account of 1832 contained in his "Voyage dans L'Amérique Meridional".

As my companions would be occupied for three days on their difficult descent from Higuera to the Rio Grande, I pursued my studies by taking the road some 40 km to Loma Larga .... and .... returning to Valle Grande. My companions arrived the following day with examples of the wild potatoes, one *Solanum capicibaccatum* and another subsequently described as *S. higuerae* which had a semi-woody stem a metre and a half high. My ex-student Candia, as charged by me, brought many ripe fruits of the cactus *Cephalocereus guentheri* as well as photographs of the same taken in its natural habitat. Leaving Valle Grande to return to Cochabamba and after a few km along the road, we came across the magnificent *Puya Olivaccia* with an inflorescence of olive green colour with whitish lilac flowers. This Bromeliaceae was discovered by Herzog in the Quebrada Charagua.

.....from H. Middleditch

One might be allowed to presume that the examples of *Vatricania* which were seen on the Riviera in the course of our Cactus trips in the 1960's would have been raised from the seed obtained by Cardenas during the course of his 1955 trip to Valle Grande.

.....from F. Ritter, Forty Years' Adventuring.

[Leaving Valle Grande on 16 July 1958] At a spot named Juntas, where sugar cane was being crushed in a mill driven by oxen, I found food and lodgings. On the next morning, I set off down-river to Marqueza, where I had to wade across the river, in addition to obtaining a midday meal for myself and making enquiries about the route by which I would return. In a hut an Indian wife very promptly made me a midday meal. I did not intend to come back on the same route, but from here to make a considerable ascent to Santa Ana and go back from there to Valle Grande. I climbed up a valley up to where it became like a gorge with high perpendicular walls at each side. The sun was already going down, when I saw a tall *Cereus* with long white to fox-red cephalium. That had to be *Vatricania guentheri*. The time of day did not admit of making a proper examination and consequently I had to stop here overnight. It was an unpleasant night. Already in Juntas on the previous night I had been tormented by midges, but here they came in huge swarms the whole night long, in such numbers as I had not previously experienced ... after an endless wait, the morning dawned. I took a sample of the *Vatricania* and also details of the flower. After making more climbs during this day and discovering various novelties, once again I was obliged to stop out in the open overnight.

.....from B.Bates

During our trip to Bolivia we made an overnight stop at Padilla and on the following morning we set off heading for the Rio Grande with the intention of crossing the river and continuing to Higuera and points north. We made one stop not long after leaving Padilla and another north of Serrana, where we find *Sulcorebutia crispata* which are exactly like the plants of KK 1154 and Lau 394 which are so common in cultivation. We make another stop, which yields no cacti. After Nuovo Mundo we make another stop when *Harrisia* is to be seen sprawling near the side of the road. There is also *Roseocereus* there and I am now in total agreement with David Hunt that *Roseocereus* is in fact synonymous with *Harrisia*. On closer inspection, we also find a variety of *Gymnocalycium pflanzii*, various *Cerei*, *Pereskia sacharosa* and *P.diaz-romeroana*, a *Cleistocactus*, and a couple of *Opuntias*. We travel a little further on and a stop is made to investigate a fruit on a 6 metre high *Cereus*. The intention is not to stop long so the engine is left running, but on reaching the ridge I shout back to switch off the engine as I have spotted *Vatricania* complete with cephalium. They are beautiful with their ginger whiskers. There are also many of the species from the previous site, but *Peireskia* is not to be seen. About 8 km further on we encounter a muddy stretch where a stream crosses the road. Despite engaging four wheel drive, we get well and truly stuck. Eventually, after struggling for about three hours, we have to go for help to be towed out. So our hopes of crossing the Rio Grande are dashed and it is back to Sucre again.

.....from P.Down

On our trip to Bolivia in company with B.Bates we had spent an overnight stop at Padilla. From there we set off eastwards and after passing Nuovo Mundo the road became an even rougher track as we began to descend into a wooded valley. The trees were quite dense, although many of them might better be described as large bushes rather than forest size trees. There were many which looked to me like *Acacias* and there were lots of *Peireskias* growing amongst them. At times the whole floor of this woodland seemed to be covered with bromeliads similar to the common red-spiked version, these plants being as abundant as bluebells covering a woodland floor in this country. We did not stop to examine the bromeliads but they certainly looked similar to *Vriesias* I have seen. Having passed through an area populated by terrestrial bromeliads we then came to a woodland where very little was growing on the floor. Here we found *Gymnocalycium pflanzii* on the ground and *Harrisias* climbing through the bushes just like blackberries do in Britain.

We came to a halt at a spot where B.Bates saw something of interest standing up out of the bushes. There were pale gingery cephaliums on a *Cereus* type plant. We walked into the wood and met our very first specimen of *Vatricania guentheri*. There were probably only about 10 plants at this particular spot but they were all old established plants, some with stems 2 to 2.5m tall (6-8 ft.). Most of the stems that had grown to a height of between 3 and 4 ft had a whitish gingery cephalium which were all roughly on the same side of the stem, probably the north facing side as we photographed them looking east. With the flower buds and flower remains sticking out of the cephalium hair, many of them looked like profiles of hairy men. The cephalia did not seem to get longer and longer but those we saw were all on the top 30 cm (one foot) of the stems, whether the stems were 4 ft tall or 7 ft. tall. We were down on the floor of the valley and only spotted these plants because some of the stems protruded above the surrounding bushes. Because all the brushwood was growing so close together we were unable to see if any other plants of *Vatricania* grew anywhere in the vicinity. But the plants we did see looked very healthy so I would suspect that there were plenty of them in the neighbourhood, if we had been prepared to push through the brushwood and look for them. At this point we were at about 4200 ft altitude (1300m) which was the lowest point that we reached in the whole of our trip to Bolivia. Not too surprisingly, that temperature seemed warmer here than anywhere else we went in Bolivia.

.....from I.H.Lawrie

A visit was paid to Edinburgh University Library in order to consult the "Voyages dans l'Amerique Meridionale (1826-1833)" by Alcide Dessalines D'Orbigny, published in 1844, to try and trace any reference made by the author to the "curious cactus" which was subsequently described as *Vatricania guentheri*. This work was published in 9 Volumes, the first three of which relate to his journeys, the rest relating to various aspects of natural history, birds, mammals, etc. In Volume 3 Book 1, the Chapter XXXIX Section 2 is headed 'Voyage from Santa Cruz de la Sierra to Chuquisaca, by the provinces of Valle Grande, La Laguna, and of Yampasas'. This includes his journey from Valle Grande via Nouveau Monde to Pescado.

.....from H.Middleditch

My very ancient foot-square map of Peru and Upper Peru (present day Bolivia) is undated but must be roughly pre-1830 as there is no Ecuador, it being still part of Colombia at that time. The then capital town of upper Peru appears on this map as Chuquisaca, which was subsequently renamed Sucre. This will be the Chuquisaca referred to in D'Orbigny's heading to his Chapter XXXIX, above. The probability is that D'Orbigny's "Yampasas" is the present Yamparaz. In crossing the Rio Grande between Valle Grande and Nuevo Mundo, D'Orbigny could have seen *Vatricania* either on the descent to the river from present-day La Higuera, or on the ascent after the crossing.

### **FROM VALLEGRANDE TO VILLA SERRANO By Alcide d'Orbigny Translated by H.Middleditch from Voyage dans L'Amerique Meridionale Vol.III Part i. 1844**

On 30 November I made my farewells to the good inhabitants of Valle Grande and set off towards Chuquisaca. The first day's journey was of ten leagues as far as Pucara. At first I followed the plain for one league, along the foot of the mountains, not without reflecting on the immense profits which could be obtained from cultivation in these fields free of tillage. After that I started to climb the verdant slopes. There I no longer found the aborescent vegetation of the Yungas, but some small stunted bushes in the midst of grassy plants, or



herbs of not many varieties. However I noticed many species of heather with red flowers and ranunculus with yellow flowers. On reaching the summit of the ridge, I caught sight of the peak covered either with mosses or with lycopodium, or elsewhere with a great quantity of ferns, the whole having at that time taken on the freshness of Spring, on account of the continual action of the rains.

I continued southward for 3 leagues on the top of the ridge which dominated all the surroundings. If I direct my gaze towards the east I have at my feet the continuation of the valley which cuts its way more and more downwards and beyond that the mountains of bare sandstone. If, on the other hand, I cast them to the west, the aspect changes completely. There is, in every direction, an immense extent of mountains separated by deep valleys, amongst which I can make out in the distance, like canyons, the Rio Mizque and the Rio Grande, with their precipitous sides.

Having left behind the summit, I notice that the last branch of the Cordillera oriental gets considerably lower and comes to an end at some leagues to the south. This is not the imposing chain which I crossed in going from La Paz to the Yungas, nor yet the outstanding peaks which dominate Cochabamba, displaying on all sides their snows and their perpetual winter. The Cordillera, in becoming lower, have changed their form and appearance. A sharp ascent of two leagues on sandstone ground brought me to Pucara, where I was more than five or six hundred metres below the crest which I had just left behind me.

Pucara is only a miserable little village, where the farmers have established their dwellings in order to go up to the troops of horned animals and sheep. If it was not on the necessary route from Santa Cruz to Cochabamba, there would be nobody to be seen here. But it becomes attractive because this is where the traveller finds guides and horses to cross the Rio Grande, one of the dangerous passages in the Republic.

The surroundings of Pucara no longer resemble the high mountains; the slopes there are covered with spiny bushes and dense woodlands are displayed in all the surrounding valleys. The appearance of these valleys, or perhaps they are better described as depths, is rather wild and above all majestic. The confluence of the Rio Grande and Rio Mizque, which is to be seen a short distance to the west, is particularly noteworthy for its depth and the steep mountains on their banks, which rise up like high walls covered with vegetation. From excursions into the surroundings of the village, I procured many objects of natural history and especially of new humming birds. Having succeeded in procuring a good guide and his horses accustomed to struggle against the current of the Rio Grande, and on that account called vadeadores [forders], I took leave of Pucara on 2 December, having to travel for ten leagues as far as the Rio Grande. I started to descend on the pretty abrupt slopes and by barely visible paths, to the edge of the frightful precipice, rolling with scree or slippery on the clayey parts moistened by the rain, which I never ceased to meet. At Pucara the temperature is cool, but in proportion to our descent I was sensible of an increase in temperature until it was much to put up with towards the middle of the day. I cross several distinct geological zones, gathering silurian fossils and especially trilobites. I see the vegetation alter in form and I admire the whole panorama which offered itself to me, now contemplating the depths of the bed of the river, now seeking to understand the collection of mountains on the opposite side.

The journey lasting the whole of that day had only brought me to the foot of the slope, where I bivouac in a deep ravine. On arrival, I was really dazed by all that I had seen during the morning. The sandstone rocks, displaying their scarp slopes, their deep clefts crowded with magnificent yews, the effects of the water on the decomposition of the blackish silurian rocks, presenting a picture of confusion, the magnificent viewpoints, the varied woodlands, and also the slides which I had made with my mule, at the risk of tumbling into the abyss, presented themselves successively to my imagination. A trip to the middle of an unvarying countryside leaves few recollections, but here the varieties of nature offered more souvenirs in one day than in the entire weeks on the plains.

The spot where I pitched camp bore no resemblance to the rest of the slope. It was no longer the summit covered with heath or cryptogams, the bushy terrain of Pucara, nor the woodland of yews which I had noted above. The zone which I had reached displayed only a most remarkable specialised vegetation, consisting of spiny bushes, similar to those which I had observed in the vicinity of Chilon, and numerous cacti of six or eight different species. One of them, like a large tree, arranged like a candelabra, displayed fairly succulent fruits. The others carpet over the ground and hid themselves under their numerous spines, whilst others rose up like candles for one or two metres. The most curious ones displayed at their tops a long white head of hair, which drooped to the side. Independent of this vegetation, the soil, on account of the salinity of the ground, was covered in the gulleys with saltwort and other seaside plants.

On emerging on to the bed of the Rio Grande on the next morning, I see the deep and wide track where flows the river, foaming and bounding with reddish waters laden with silt. The river, confined to its bed, cannot be crossed; but in order to ford it one selects a place where it is divided into three arms. Crossing at this spot is only possible in the dry season because in the rainy season the waters are too deep to cross on horseback. [The alternative crossing by carrier basket on a single suspension rope made from lianas is described in detail] More than two hours were occupied in this crossing [described in detail].

In crossing the Rio Grande I had left the province of Valle Grande and entered that of Tomina, within the Department of Chuquisaca. In extreme and trying heat, I followed the alluvial terrain or the hills of schist. I go downstream on the right bank and tread now on beaches covered with seashore plants, now the start of the cactus zone, which occupies about five hundred metres of height on the valley sides and presents a greyish blue tint, contrasting with the verdure of the woodland set above them. The general appearance of the valley is dismal; everywhere the ground is bare and the cactus, although curious, do not really embellish it.

Ere long I left the side of the river and started to ascend a small ravine, walking on decomposed schist, on which I slipped at every footstep, the more so because the rain was falling heavily. For the rest of the day I continued to climb and, with difficulty, reached the small farm of Pampa Ruiz, where we stopped the night. It

poured down all night and we stayed here the following day as our only onward route was the bed of the Rio Cucillo whose torrents rolled boulders and lept around with great din. On the following day we set off, fording the torrent many times. After some hours of struggle, the ravine divided, after which our troubles lessened. We followed a deep ravine, shaded by large trees. The ravine became steeper and steeper, which I left by means of a difficult ascent of the side, bringing me to mountain top. Here, I was nearly at the altitude of Villa Grande, on a plateau covered only with grasses on which arose here and there isolated hillocks of friable sandstone in almost horizontal beds. After having been some days enclosed in the deep ravine, it was a pleasure to have this vast horizon unroll before me. By evening we had reached the small hamlet of Nuevo Mundo.

.....from T.Marshall

On our 1998 visit to Bolivia we followed the general line of this route, but in the opposite direction. We had camped overnight just to the north of Nuevo Mundo, which was only a small village with no real accommodation for tourists. From here we followed the same road as that taken previously by the BDH party. In passing through the well wooded area we did see *Vatricanis guentheri*, with its flowers fully open in the early morning. Ere long we reached the valley of the Rio Grande which was very steep sided indeed, so that the road dropped down to the river level by innumerable zig-zags. It was still well wooded during most of this descent, but we no longer saw any *Vatricania* on this section, nor on the subsequent ascent.

Once down into the bottom of the valley we saw *Quiabentias* close to the river bed, but they were not seen in the course of our descent, nor on the ascent after we had crossed the bridge over the river. Again the ascent of the valley side was achieved by innumerable zig-zags in the road which gained us altitude but did not take us a great distance from the bridge. We had travelled for 20km when the bridge still appeared to be only three or four km away down in the bottom of the valley. When the gradient started to ease off we came out of the woodland and into grassland, which continued along the road to Valle Grande.

.....from A.B.Lau, Cactus Log, U.S. C.& S.Jnl. Vol.54 1982

Around the middle of the day we arrived in Pucara, coming from Valle Grande, over a very rocky dirt road where we had to reach an altitude of 2700m. We had been told that this was the end of any drivable track. From here it would be on foot. The trail would take us through La Higuera, at 2400m above sea level, where we stopped the night. From here, it took us five hours travelling before we reached the Rio Grande and our destination.

At 1400m we saw the first examples of *Gymnocalycium riograndense*. We found this species all the way down to the river at 900m. Around the 1200m level, the great moment arrived. Gazing into the valley from a good vantage spot, our eyes beheld the foxtails of *Vatricania guentheri*. It is not rare in habitat. Just before reaching the river, our attention was drawn to a few hills of greyish-black slate. We did find an unusual *Echinopsis* there of which I only collected a few specimens (Lau 344) and sent them to Dennis Sargent, who lost all of them. There was a resemblance to *Echinopsis subinermis* but the plants were much larger and cereoid.

.....from H.Middleditch

It may be surmised that these "hills of greyish-black slate" were those which D'Orbigny described when on the floor of the valley as "the cactus zone on the valley sides" of a greyish-blue tint and of a dismal appearance. Their bareness is also evident in the picture of these slopes which is included in the Lau Cactus Log.

## **CHILEAN'S 2000 WEEKEND**

The event will be held at Nottingham University over the weekend of 15-17th September, being the last available weekend prior to the return of the students into residence. It is anticipated that we will again be joined by R.Hillman who has made further visits to Chile and Bolivia since we last welcomed him to this event. It is also anticipated that we will be able to hear from G.Charles, from M.Lowry, from T.Marshall, and from M.Williams about their own field trips. P.Hoxey will describe his recent visit to northern Peru which he made with A.Lau. Outline details will be sent to regular participants and to any other members on request.

## **SUBSCRIPTIONS**

A subscription renewal form is included with this issue of the Chileans covering the next three issues. Your prompt renewal would be much appreciated. The updated edition of the Map Compendium will shortly be available.

## **THE BCSS NATIONAL SHOW 2000**

The Chileans will have a publicity stand at the BCSS National Show on August 19th at Springfields Exhibition Centre, Spalding, Lincolnshire so please come along and meet other members there.

## **BACK NUMBERS**

You will notice on the renewal form that back numbers of the early years are no longer offered for sale. We plan to sell off the remaining stocks at the BCSS National Show in August, so if you need any to complete your set, either order them now or come to the Show stand. Your last chance!

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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
Frailea	C.Holland, Newling Farm, Litcham, Kings Lynn PE32 2PB
Lobivia	M.Lowry, 7 Bygot Close, Leconfield, Beverley HU17 7NN
Matucana	D.Aubrey-Jones, 62 Rosehill Park, Caversham, Reading RG4 8XF
Melocactus	J.Arnold, Suffolk House, 2 Oak Hill, Washingborough, LN4 1BA
Neoporteriae	R.M.Ferryman, Nichelia, Leckhampton Hill, Cheltenham GL53 9QJ
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