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**Browningia candelaris**  
Rio Majes Valley, Peru

Photo:- P. Hoxey





*Loxanthocereus riomajensis*



*Lobivia pampana* - fruit



*Browningia candelaris*

Rio Majes Valley.

Photos:- P. Hoxey

## ALONG THE RIO MAJES. From F.Vandenbroeck

Coming from Arequipa, we drove north through an endless sterile desert up to the valley of the Rio Majes, one of the most remarkable places I have ever visited in South America. It is an isolated world in the midst of an extensive lifeless desert. This valley represents a most remarkable phenomenon, for one suddenly arrives at the brim of a deep broad valley with a lush green floor which seems to lose itself in hazy distances. It takes half an hour by car to get down to the valley bottom. Along the valley we did see some villages. According to Ritter's indications, *Islaya grandis* should occur here, but we did not find it. The only clue we possessed was "Rio Majes valley, Cerro Negro". We did enquire around for this Cerro Negro, but only received confusing answers.

Travelling northwards, the road leaves the valley of the Rio Majes and at first traverses an extensive fertile plateau, where there are small farms with crops and cows; eventually it leads up to barren slopes where cacti occur. The community of cacti which we found there consisted of the following species:- *Opuntia crassicylindrica*, *Neoraimondia peruviana*, *Browningia candelaris*, *Weberbauerocereus weberbaueri*, and two further species the identities of which were not clear to me at that time and place.

One of these was a cereoid plant with a decumbent sprawling appearance, but it occurred to me later that it was probably simply a form of *Haageocereus platinospinus*, a species which is fairly widespread in the Arequipa area. Indeed, Rauh in his book on the cactus of Peru, does mention a *Haageocereus pluriflorus* from the lower valley of the Rio Majes, a plant which is considered by Ritter as only a variety of *Haageocereus platinospinus*. I do recollect seeing *H.platinospinus* in the valley of the Rio Chaparra, which is even farther away from Arequipa; the occurrence of this species in the Chaparra valley is confirmed by Ritter in his *Kakteen in Südamerika*.

The second of these doubtful species was seen, and photographed, to the north of Aplao where the road winds steeply out of the valley in the direction of Chuquibamba. The mountain ranges in the background are just like those to be seen where we first descended into this valley, and very similar to those on Rauh's picture overlooking the Hacienda Ongoro, his Abb.52. If Rauh travelled this same route, he must also have seen this plant. It usually grows about 1.5m tall and some specimens may show a somewhat more sprawling habit. I now assume it to be *Trichocereus glaucus*. Ritter mentions as the Type habitat for this species, the lower valley of the Rio Tambo. He also says that it is to be found in the "mountains around Ilo". Although we were at both of these places, we did not succeed in finding this species at either place.

There is a further name of a plant occurring in this area: *Loxanthocereus riomajensis*. Ritter does away with it as a "nomen dubium delendum". This plant is unknown to me and I have never seen a picture of it.

.....from J.Arnold

We had two major reasons for our trip to the Rio Majes valley, apart from the fact that it is not too well explored. We wanted to find *Islaya grandis* and also *Loxanthocereus riomajensis*. The latter was evidently found by F.Vandenbroeck and my seedlings grown from his collected seed appeared to be very interesting even though they are still quite small.

We left Arequipa after a two night stay, in November, heading for Camana. We struck off the Pan American highway in order to visit the Rio Majes valley. Entering the valley, we found it initially to be fairly narrow, but it soon became wider, where the road ran for a considerable distance between fairly steep mountain sides which appeared to be very barren. Along most of the valley the mountainsides on the northwest side lay a fairly short distance from the river, but somewhat further away on the southeast side. At either side of the road there are fairly big fields in which rice, cotton, asparagus, and fruit were being grown by irrigation from the river.

There is something bizarre about farm fields sandwiched between obviously barren hillsides with little or no vegetation on them! The cultivation is extensive, large interlinked fields with elaborate irrigation systems. The valley is a long one and it was lunch time when we stopped for a break in a market square. We were still in the midst of intense cultivation with no sign of any land suitable for cacti. We set off again and for mile after mile it was still the same, increasingly feeling that we would never see any cactus. Eventually, however, we came to a section of the valley which was not much wider than the river, where the road had to run part way up the mountainside as there was no room for it next to the river. Then a vista opened out as the road came out on to a wide plateau, only a mile or two before reaching Aplao.

At the village of Aplao we took a left turn which at the time we thought was still the main valley road, but it turned out to be a side valley. After leaving Aplao, this road went almost straight across an almost flat plateau, but after some miles the ground dropped away with a shallow slope to another plateau at a lower level, with craggy mountains beyond. Just before the road entered a gorge between craggy hills, we spotted a large sprawling plant of a sort not seen by us before. It was only a few metres from the road, albeit down a fairly steep and dusty track.

Once close to this plant I recognised it immediately as a large version of my Vandenbroeck *Loxanthocereus* seedlings. There were, however, no flower or fruits. It was a very stout plant with large sprawling stems up to a metre long, or even longer, and 10cm in diameter. Even small offsets were massive. It had extremely thick and stout central spines. My own impression was of a plant similar to the *L.acanthurus* which we had also seen in Peru. It was the only sort of plant here. On the plateau below and a considerable distance away we could see large columnar cacti.

We continued up this side valley until the first of our recorded stops at ACL 515. This was 19km to the NW of Aplao at 1195m altitude, in a gently sloping valley surrounded by high precipitous mountains. Here we turned round because of the distance travelled and also because we had failed to find *Islaya grandis*. But here



there were large numbers of what at the time we took to be *Loxanthocereus riomajensis* which demonstrated that it was moderately variable. Many of them were not as thick stemmed as the first one we had seen. They generally branched from the base, the stems growing upright for some length and then sprawled, but the heads still faced upwards. There were no buds or flowers to be seen, but there were (old?) fruits. I think that F. Vandenbroeck was very fortunate to collect any of this sort of seed as there was no seed at all in any of the numerous pods that I found. It was most frustrating as there were a great many of them, all completely parasitised, being full of orange dust and white chaff. Incidentally, the fruits on *Loxanthocereus* were parasitised everywhere we found them.

These plants grew in company with *Browningia candelaris*, which were not huge specimen, most of them fairly short, indicative of a dry habitat, growing to a little more than head height, perhaps 6 or 8 ft high, with very few short branches. There were also *Cumulopuntia sphaerica* with large joints, *Neoraimondia arequipensis* which were not large clumps but with a few tall and very stout stems. Also *Weberbauerocereus* - possibly *W. weberbaueri* - which grew as large and occasional clumps, branching from at or near the base. However these plant seemed to me to be not that significantly different from those we had seen near Yura, just above Arequipa, where the stems were thicker and not so tall, also the clumps there were looser and not so tightly packed. Could the more extreme habitat conditions here in the Rio Majes valley account for the differences?

All these plants were fairly well spaced out over a large area with the supposed *Loxanthocereus* more likely to be found on the sides of the shallow dry rivulets. The other plants more out in the open on the flat and very rocky shallow slopes. Plants of all types displayed a range of size from small to large. This area did not seem to be a particularly arid one and one does wonder if the coastal mists extend this far inland. It was a lovely quiet place and during the whole time we were there no other vehicle passed by.

After roaming round for about a couple of hours and not finding *Islaya grandis*, we realised we were in the wrong place and so we drove back to Aplao and turned left to go up the main valley again. Some 15km north of Aplao we stopped near the village of Ongoro, at 938m altitude, ACL 516. The whole area was flat, dropping to the river some distance away to the right of the road, with jagged high mountains bordering all round the river valley. Ongoro is a small but growing community. Immediately behind the house on the left of the road (a sort of ribbon development) it was a very flat and rocky area stretching away into the distance in the general direction of the side valley already explored. For a distance of several hundred metres behind those houses, roads had been laid out together with what looked like footings for houses. In a few years time this area might look very different. We drove down one of these roads for perhaps half a mile until we had left the area of cultivation well behind.

Where we stopped was dotted with large brown and red rocks and very hot. It was a fascinating area because rocks and boulders from small to car sized showed excellent examples of exfoliation, presumably from extreme heating during the day and cold at night. Some of the spherical rocks were especially superb with the exfoliated layer retaining their spherical shape and enveloping the residual rock. Amongst this rock we eventually found *Islaya grandis*, in every sense living up to its name. It grew with *Cumulopuntia sphaerica* and the supposed *Loxanthocereus riomajensis*.

We actually found few of these *Islaya* on the flat ground. It was when walking further from the village when we found a shaly bank leading down to a wide and dry flat river bed that we found many *Islayas*. Sometimes they grew only six inches or so from one another so that we could get ten plants in one camera shot. They grew on the immediate brink of the bank as well as on its sides, down to the foot of the slope. There were many large plants up to about a foot tall and 4 or 5 inches in diameter. Some of the large plants had become top heavy and fallen down to the base of the bank where they were dying. Others lying on their sides looked as if they might have re-rooted. There was also good evidence of regeneration, with a good number of small plants about one inch in diameter. We did not see any very small plants as they probably germinate down amongst the gravel.

*Islaya grandis* is very different from other *Islayas*. It is very much larger and can even be said to be massive and thick-set. It is also very heavily spined. The habitat so far inland is very unusual, as this is clearly a very arid area indeed. Not only is there no other vegetation but there was not even any sign of seasonal growth of grasses.

.....from G.Charles

Having descended into the valley of the Rio Majes we found the flat bottom of the valley given over completely to intensive agriculture. This aspect continued until we had passed the Hacienda Ongoro; after passing the narrow part of the valley where we found *Islaya grandis*, we came once again into a wide, flat valley floor, but now there were no signs of agriculture. The wind was whistling up the valley and presumably brought with it from the coast the moisture which allowed the *Islaya* to survive so far from the sea. Our timetable required us to return forthwith to the Pan-American highway so we did not go as far as the spot where Vandenbroeck took his picture of the unidentified columnar plant. Nevertheless I would be inclined to suggest from his photograph that it was a *Corryocactus*. In the course of our trip to Peru we did see *Corryocactus* at various places. It is a plant that can grow at some locations to the height of a tree and have numerous branches, but elsewhere it can grow to about chest height with only a few branches. The plant in Vandenbroeck's picture branches from the base and has distinct ribs, with an overall appearance not unlike *Corryocactus* we did see in Peru.

.....from M. Williams

Travelling north along the coast from Arequipa, we were able to pay a fleeting visit to the valley of the Rio Majes. We were aware that *Islaya grandis* was to be found somewhere in the neighbourhood of Hacienda Ongoro. Very shortly after passing that habitation we stopped at a spot where earth moving equipment was at

work improving the road, and we cast our eyes around to look for signs of cacti. We would be in a cutting about one hundred yards wide, occupied by the road and the river. It might have been about 150 feet up to the top of the very steep slope recently cut by the road works, when Chris Pugh caught sight of some plants at the top of the cutting. With the binoculars we could then see that they were indeed cacti. We could only access the spot by going further up the road, climbing a far less steep slope, then walking back over level cultivated ground to where we had seen these plants. Right on the edge of the cultivated ground, at the lip of the sheer drop, there were three *Islaya* to be seen which we considered to be *Islaya grandis*.

We believed that the coastal mists might at times come this far inland and provide the necessary moisture for these plants to survive here. We did stop at several other places in the same area to see if we could find any more of these plants, but without success. Further beyond Hacienda Ongoro we were able to see some cereoid cacti in the far distance on the opposite side of the river - too far away to attempt any identification.

On a subsequent visit to the Rio Majes valley we again noticed how narrow, steep-sided and barren it was until we were within a mile or two of Aplao, when the valley became much broader with a wide floor which was given over to the cultivation of many crops, including rice. We turned left away from the main river valley and at a point where the road was cut into the side of the hillside it was where *Islaya grandis* had been seen on the occasion of a previous visit by my travelling companions. It was immediately apparent that these plants were *Islayas*, but they appeared to be larger than those I had seen before. They occurred only above the road and they were very difficult to reach as the hillside at this spot was very steep. The lowest part was almost vertical to the edge of the road and above that the surface was very crumbly. I had to content myself with looking at these plants from the road, but another member of the party estimated that he had climbed up for several hundred metres and in his opinion the nicest plants were then to be found, up to 10 inches tall by 8 inches across, some of them in fruit.

Further on from Aplao the road leaves the river and the cultivation, taking a route through its own narrow valley. We came across a solitary short columnar plant close to the road which had neither flowers nor fruit. It had curving stems up to two feet long and up to 3 inches thick, becoming prostrate. We pondered on whether it could be a *Haageocereus* or a *Loxanthocereus*, the altitude of ca. 1000m favouring *Haageocereus*. To me, a *Loxanthocereus* would appear to have more slender stems, but I had seen stoutish stems on *Loxanthocereus* in the Pisco valley and on *Loxanthocereus jajoianus* near Uyupampa, to the north of Yura, on a previous visit to Peru.

.....from P.Hoxey

Our visit to the Rio Majes valley took us beyond Chuquibamba and then over a ridge into the higher reaches of an adjacent valley. We returned along the same route and stopped after passing through Chuquibamba, before reaching Aplao. Here we were fortunate enough to find *Loxanthocereus riomajensis* in bloom, with its red zygomorphic flowers.

.....from H.Middleditch

These *Loxanthocereus* seen and photographed by P.Hoxey do indeed grow upright, apparently branching from close to the base. The stems appear to be quite densely clothed in a coat of spines, so that they seem to entirely obscure the body itself. Evidently Rauh did not see his "*Loxanthocereus* (?) *riomajensis*" in flower at the time of his visit there as there is no reference to the flower in his description of this species in his Peruvian Cactus book. The "?" at the start of his description would suggest that the appearance of the plant was hardly typical of the many other *Loxanthocereus* evidently seen in the course of Rauh's visits to Peru.

.....from J.Arnold

Now that I have seen one or two photographs of *Loxanthocereus riomajensis* in flower which were taken by P.Hoxey in the Rio Majes valley, and also seen the picture of this plant which Rauh has in his Peruvian Cactus book, it is quite clear that what we took to be this sort at the time of our visit, was not that at all, but would be a *Haageocereus*.

.....from P.Hoxey

The sprawling plant thought to be a *Haageocereus* was evidently seen by F.Vandenbroeck shortly after the road left the main valley of the Rio Majes, going in the direction of Chuquibamba, so that might not be far from where we ourselves stopped, where both *Neoraimondia* and *Browningia* were to be seen. We were at 1220m altitude, which fits in with the altitude band given by Rauh of 700 to 1500m for *Haageocereus*, so it was recorded as *Haageocereus pluriflorus*. In general appearance it compared well with the picture of this species on p.124 of the Rauh Peruvian Cactus book, and with the close-up of a stem on his p.388.

.....from H.Middleditch

From the book by W.Rauh of the Peruvian Cactus vegetation, it would appear that his visits to Peru did involve travelling in the valley of the Rio Majes. A summary is provided of the cactus flora to be seen on his route there, as follows:-

700-1500m	<i>Islaya</i> , <i>Haageocereus</i> , <i>Tephrocactus</i>
1500-2000m	<i>Neoraimondia</i> , <i>Browningia</i> , <i>Weberbauerocereus</i> , and <i>Armatocereus</i>
2000-3000m	<i>Armatocereus</i> , <i>Browningia</i> , <i>Weberbauerocereus</i> , and <i>Corryocactus</i>
3000-3800m	<i>Corryocactus</i> , <i>Lupinus</i> , and bushes
3800-4000m	<i>Trichocereus</i> and bushes
Over 4000m	<i>Oreocereus</i> , <i>Tephrocactus</i> , and dwarf <i>Tola</i> bushes.

In addition, it is observed that the town of Chuquibamba lies in an upland basin at about 3000m altitude. The unidentified tall columnar plant was seen by F.Vandenbroeck prior to reaching Chuquibamba and hence must have been seen at below 3000m altitude. On the basis of the information given in Rauh's book, this would rule out *Trichocereus*.

It is noted that F.Vandenbroeck makes no mention of *Armatocereus* at this altitude; his photograph is of a

plant which:-

- branches from (or very close to) the base of the plant
- from the four ribs in camera it may have 7-8 ribs to a stem
- has well spaced areoles
- has an apex of parabolic shape,

Comparing this with the the description of *Armatocereus riomajensis* Rauh & Backeberg, and also with Abb.128.II, both provided in the Rauh publication, it would seem to be quite possible that the unidentified plant seen by F.Vandenbroeck between Aplao and Chuquibamba was this species.

.....from F.Vandenbroeck

The conclusion, that the plant seen in the Rio Majes valley which we could not identify, was *Armatocereus riomajensis*, seems to be logically derived from Rauh's statements and illustrations. However, in my eyes, this tentative identification seems rather improbable. It is my experience that the genus *Armatocereus* is very easily recognised in the field. It might perhaps be stated that it should be virtually impossible to confound this genus with any other in the field.

According to Ritter, *Armatocereus riomajensis* seems to belong to the complex around *A.gbiesbreghtii* and in the course of my travels I saw a great number of these plants. They are fairly numerous on the western side of the Andean slopes and tend to vary considerably. I can remember seeing gigantic arborescent specimens and others that remained rather bush-like. On the other hand, the *Trichocereus schoenii* illustrated by Rauh comes very close in appearance to the plant we found. Of course Rauh reports it occurring at very high altitudes (3500-3900m) which makes a possible identification on that basis seem rather unlikely.

However, comparing Ritter's description of *Trichocereus glaucus* with Rauh's description of *T.schoenii*, one gets the impression that both authors are describing the same plant. Also Ritter's Abb.1194 (of rather poor quality) does display resemblances to Rauh's Abb.173.ii. Is *Trichocereus glaucus* a low-altitude variant of *T.schoenii*? The question remains why Rauh did not see these plants above Aplao i.e. at an altitude below 3000m prior to reaching Chuquibamba. He made his trip half a century ago and he may have simply overlooked them.

.....from H.Johnston, A visit to Peru, K.u.a.S 3,3:1952

[Having left Arequipa] .... After a rest at Quinta Bates we drove westwards and then over a completely sterile landscape to the valley of the Rio Majes, then further along the Rio Majes in the direction of the snow-covered mountain of Coropuno. It presented a magnificent picture. As we left the valley, the climb into the mountains towards Chuquibamba was very difficult. From about 2000m we came across *Browningia candelaris* and a new robustly spined *Haageocereus*. One other smaller bristly-spined *Cereus* was not in flower, so that I as not able to determine the genus. At a higher altitude we found numerous pink-flowering *Neoraimondia*. A *Trichocereus* identifiable as from the group around *Trichocereus peruvianus* had robust white spines and upright growth. A fine new *Trichocereus* with white woolly areoles, related to *T.fascicularis*, occurred in abundance. *Armatocereus* was as frequent as *Corryocactus*.

We then turned back and reached the road to Camana and the fog zone. Below the Pampas as we entered the lower mountains we discovered an attractive branching type of *Haageocereus* and a nice new *Islaya* with dark red flowers. All the other *Islaya* have yellow flowers.

.....from H.Middleditch

Is it possible that the "Trichocereus with white woolly areoles" may have been a *Weberbauerocereus*? In his Peruvian Cactus book, Rauh observes that *Weberbauerocereus weberbaueri* is to be met with in the Rio Majes valley and his illustration of this species in his Fig.204.III is certainly a plant with very woolly areoles. Was the red flowering *Islaya* found in the lower part of the Rio Majes valley before reaching Camana, or perhaps it was seen much nearer to the coast?

.....from W.Hoffmann, K.u.a.S. 16.9:1965, Peruvian diary

A journey through the Rio Majes valley via Chuquibamba to the high plateau of the Puna near Pampacola afforded us one of the most impressive cross sections through the cactus flora of the Peruvian western cordillera. The region around Hacienda Ongoro on the Rio Majes forms, with its staggered terraces of blocks of rock and the foot of the steeply rising mountains, the Type habitat of *Islaya grandis* and its variety *brevispina*, discovered at the same time by Rauh. At 75 km from the coast this is the furthest point inland of *Islaya* which otherwise grow right up to the beach of the Pacific. It seems paradoxical that species with relatively smaller bodies inhabit the moist zone of the Garua mists whilst *Islaya grandis*, which grows up to 50cm high, very seldom gets any dew and never gets any rain, like all the other species [of *Islaya*]. This habitat, lying as it does on the scarp of the western cordillera makes Förster's claim more credible that *Islaya islayensis* Bckbg. (Syn *Echinocactus islayensis* Förster) was discovered on a volcano. One occurrence of this species which until now has not been rediscovered with certainty could have been found in such a habitat that the collector could have thought himself to be at the foot of one of the many volcanoes which on account of their height seem very near in the foothills of the Andes.

On the way to the high plateau we collected *Browningia candelaris* and *Loxanthocereus* sp. at 1700m near the village of Paicacharca and *Neoraimondia arequipensis* var. *riomajensis* which forms huge groups here. On the route to Chuquibamba we frequently observed *Weberbauerocereus weberbaueri*, *Armatocereus riomajensis*, and *Trichocereus schoenii*, which mostly grows hanging down from rocks, *Opuntia exaltata*, and *Opuntia soehrensii*. We frequently found the parasite *Psittacanthus cuneifolius* on *Corryocactus puquiensis*.

.....from W.Rauh, Beitrag zur Kenntnis der Peruanische Kakteenvegetation

*Trichocereus schoenii* sp. nov. Plants 2-3(-4)m high, branching here and there from the base upwards. Stems 10-15cm thick, with 7 ribs; a vee-shaped notch arising from the upper part of the areole.

.....from F.Ritter, Kakteen in Südamerika 4.

**Trichocereus glaucus Ritt.** Bush of 1 to over 2m tall and often several m. in diameter, principally branching from below from decumbent branches, less so from above. Stems 5-8cm thick, ribs 7-9. Cross furrows between tubercles do not reach down as far as intercostal grooves. Grows in the lower Tambo valley, dept. Arequipa, also in the vicinity of Ilo.

*Trichocereus glaucus* f. *pendens* Ritt. Only three specimens found, growing on vertical rocks on the coast south of Arica, Chile.

.....from C.Ostolaza

The plant in the photograph taken by F.Vandenbroeck when travelling from the valley of the Rio Majes to Chuquibamba, seems to me to be the so-called *Trichocereus schoenii*, described by Rauh & Backeberg in Rauh's 1958 book on the Peruvian Cacti. It was reported by Rauh to be very closely related to *Trichocereus cuzcoensis*, with some differences in flower and spination.

.....from H.Middleditch

The tallish, upright growing *Trichocereus* seen by Johnston and subsequently described as *T.schoenii* in Rauh's "Peruvian Cactus Vegetation" would not appear to be identical to the the lower growing, sprawling *T.glaucus* as described by Ritter. In Rauh's account of the Rio Majes valley there is no mention of having seen any lower-growing, many-stemmed, sprawling *Trichocereus* i.e. *T.glaucus* Ritter, although they were evidently seen there by Hoffmann. Conversely, it appears that Ritter may not have seen the taller growing *Trichocereus* above Chuquibamba i.e *T.schoenii* Rauh & Backbg.; or alternatively Ritter did not find an excuse to give them a different name to which his own name would then be attached as author, an activity which not infrequently seems to have been of prime interest to Ritter.

Since most of the unidentified plants seen by Vandenbroeck stood upright, and displayed only a few stems, they would hardly be deserving of the name *T.glaucus*. And as they were seen below Chuquibamba i.e. below 3000m altitude, they would not seem to be entitled to the name of *T. schoenii*, which is said by Rauh (his p.363) to be "very frequent between 3500 and 3900m" altitude. Hence perhaps another alternative identification needs to be considered.

.....from A.W.Craig

Our travels in Peru did not take us to the Rio Majes valley, but we did see a good selection of the columnar cacti which are to be found in the south of that country. Looking at the picture of the unidentified plant taken by F.Vandenbroeck in the Rio Majes valley, I note that it branches from quite close to the base, rather than from part way up the stems. These stems have a fairly small number of ribs which seem to be rounded, rather than sharp edged with deep intercostal grooves. There also seems to be a lack of areolar wool and there are only a few long spines. Taking all these features together, they do seem to me to suggest that this plant is a *Corryocactus*.

.....from F.Vandenbroeck

Above Aplao, on the road to Chuquibamba, I found another highly attractive species, *Tephrocactus crassicylindricus*. These plants have large, neat, green segments and conspicuous yellow flowers.

.....from W.Rauh, Beitrag zur Kenntnis der Peruanische Kakteenvegetation.

***Tephrocactus crassicylindricus*.** Forming loose clumping cushions up to 1.5m across ..... segments cylindrical to barrel shaped, 10-15cm long by 6cm thick. .... Flower petals yellow. .... Habitat. Rio Majes valley, between 900 to 1200m altitude on scree.

.....from H.Middleditch

It is to be noted in his Peruvian Cactus book, Rauh indicates as a generalisation that above the coastal desert region, *Tephrocactus* occur between 700 and 1500m altitude; for the Rio Majes valley, he specifically records *Tephrocactus crassicylindricus* occurring between 900 and 1200m altitude, evidently a more restricted occurrence. He also observes that "In none of the West Andean cross valleys are the cacti represented in such a large number of individuals as in the Chuquibamba valley and in no other valley is there such a sharp stratification over such a broad extent of altitude (800-3000m) of such a range of cactus material and such a clear vertical succession of genera to be observed as in this valley".

However, from the various foregoing accounts of the cacti seen along this route, it would appear that there are still some unanswered questions remaining about a number of different plants. Not only their names, but even - like the supposed *Loxanthocereus* which it now transpires was a *Haageocereus* - their genera. For example, we appear to still have only the one report - from Hoffmann - of the sprawling, multi-stemmed, lower growing *Trichocereus* "hanging down from the rocks" before reaching Chuquibamba, when all the other above accounts do not provide a clear record of any *Trichocereus* below that place.. Room for more useful field work?

## BEYOND THE RIO MAJES. By P.Hoxey

In his book of the Peruvian cacti - Beitrag zur Kenntnis der Peruanische Kakteenvegetation - Rauh includes several pages describing his trip along and beyond the valley of the Rio Majes. There are also a few photographs of the plants which he saw there and of their surroundings. On the occasion of our visit to Peru in November 2005 we travelled from Lima down to the south of Peru where we planned to make a trip along the valley of the Rio Majes and then to continue further inland.

In order to access the Rio Majes valley, we followed the Pan American highway from Camana on the coast, inland towards Arequipa, turning off in order to cross the mountain ridge which lay between us and that valley. At an altitude of about 1000m we were able to look down into the valley below - a magnificent view!

The completely barren mountain sides contrasted with the cultivated green fields on the floor of the valley. As the hills are totally barren and the valley floor completely devoted to cultivation, we continue up the valley without making any stops, until we reach Aplao. The next morning we try one of the dry side valleys behind a small village lying a few km further along the valley from Aplao, but still see no signs of cacti. So we enquire about the Hacienda Ongoro and find that we have come too far, so we backtrack and try another rocky side valley. This was a completely dry valley of loose rocks and boulders which looked as though they had been deposited there by heavy but infrequent rains. It had a fairly level floor possibly two or three hundred metres wide and towards the middle of the valley there was a deep water bed channel, maybe 10m deep and wide where recent rain had washed away the loose material on the valley floor. Of course there was no vegetation to stop rapid erosion. On the steep sides of the gully there are at first still no cacti to be seen,

Nevertheless we start to search over the loose lumps of grey rock which pretty well cover the valley floor and find a few scattered plants of *Haageocereus pluriflorus*, standing out above the stones. They are clumping plants with most of the stems upright, the odd decumbent stem with two or three branches. The single outwardly pointing central spines are very strong and nearly as long as the thickness of the stem, with ca.10 radial spines which are again quite robust but quite short, well clear of those from adjacent ribs. The long, stout central spines even stand upright over the crowns of the stems, a yellowish brown colour, going grey later. There were some old dried fruits, mainly empty of seed. But we also found two plants of *Islaya grandis*, which fitted into the gaps between the loose stones and did not project above them, so that there could have been more of these particular plants there, hiding from our view between the stones.

Now we turn out of the Rio Majes valley, along the road which goes to Chuquibamba. Here the road follows a wide valley with a fairly level floor that might be about one km wide, where there were hundreds of *Browningia* to be seen growing amongst the stones and rocks. But they were not close to one another, about a stones' throw or more apart, most of them with up to about ten branches on a plant. There were also occasional seedling plants to be seen, solitary, of less than one metre in height, which had not yet produced their mature spination. On the older plants there were green fruits, perhaps 2 or 3 per branch, which it was possible to reach by hand, on a plant about 3m high. These fruit were of barrel shape, about 6 x 7cm, with well spaced prominent dry scales standing proud of the fruit. As far as we could see from the road, there were none of these tall plants growing on the hillsides at either side of the valley.

We also saw some clumps of *Tephrocactus crassicylindricus* here which seemed to have only quite short cylindrical segments, nothing like the 6cm thickness quoted by Backeberg in the Rauh Peruvian cactus book. The segments were of a rather wrinkled appearance as if they were still in their resting season and somewhat dehydrated.

As we continued along this broad valley towards Chuquibamba, we began to see some *Neoraimondia* growing among the *Browningias* and, as we carried on, the *Neoraimondia* started to outnumber the *Browningia*. Most of these *Neoraimondia* were branching from the base, with five or six stems, occasionally with up to ten stems. There were neither buds, flowers, nor fruit to be seen on them. The scattered clumps of *Haageocereus* which we had already seen growing just with the *Browningia*, also grew in company with these *Neoraimondia*. None of these *Haageocereus* was in flower but they mostly had only dried flower remains which did not suggest a quite recent flowering. Still following a broad valley floor, we now saw some *Weberbauerocereus rauhii*, some of them branching from the base, which were not as plentiful as either the *Browningia* or the *Neoraimondia*. None of these *Weberbauerocereus* were to be seen in flower but many of them carried ripe or ripening fruit. There did appear to be some of these *Weberbauerocereus* growing on the lower slopes of the adjacent hillsides, but certainly not as common as on the valley floor.

The valley gradually became narrower as we gained altitude, still with a rocky floor, and we could now see that the hillsides were covered in gravel and grit. This was perhaps a slightly more moist environment that we had come to, with both a few grass tufts and more of the scattered shrubs that we had already seen. These shrubs were leafless and did not dominate the valley, like the cacti did. The same cacti were now joined by *Armatocereus* and *Loxanthocereus*. The *Weberbauerocereus rauhii* were in fruit, the unripe fruits green or yellowish with small green scales and brown wool which was thickest around the base of the fruit. Some ripe fruits, still on the plants, had split open to reveal the seeds embedded in a white pulp. The *Loxanthocereus riomajensis* grew in scattered clumps of up to half a dozen stems that were up to 50cm long, with a coating of numerous fine spines. Many of them bore typical red *Loxanthocereus* flowers, together with more flowers that were yet to open. We also saw fruit on some of the plants, about 10 to 15mm in diameter and still green, presumably not yet ripe.

The road now started to climb more rapidly, taking us through Chuquibamba, now and again ascending the mountainsides by a series of zig-zags, until we were at over 3800m altitude. The cactus vegetation had now changed quite markedly and all the cacti that we had seen below Chuquibamba no longer occurred here, but instead they had been replaced by *Corryocactus*, which grow up to a stone's throw apart from one another. We do see the occasional yellow flower on them, but mostly they are in fruit. There are now far more grass tussocks to be seen and the bushes are more numerous and of more species and are now up to one metre in height. We stop in order to climb up a rocky slope and look round, noticing that a number of the *Corryocactus* have a parasite growing on them, although many specimens are unaffected. This parasite looks like a small bush with branches and leaves, but with a caudiciform base where it fuses with its host. Often it has replaced the growing point of the *Corryocactus* and resembles a graft.

We now continue along our route, climbing further into the mountains, coming out of the head of the valley on to a Puna-like terrain, still seeing the *Corryocactus brevistylus*, but now *Oreocereus leucotrichus* starts to appear at about 3800m altitude. They are growing on a fairly steep slope above the road, here with large boulders and smaller rocks but a fine, silty soil. Many of these *Oreocereus* are forming clumps with up to





20 or 30 heads in a clump. Their wool is quite variable in colour, ranging from white to brownish, but pure white is the most common colour. There are also plants with yellowish spines and others with brownish spines. We see several flowers with their stigmas projecting a cm or more out of the mouth of the flower. Most of these *Oreocereus* are in fruit, which are yellowish, nearly spherical, about 5cm in diameter and easily detached from the parent plant. Most of the fruit has the seed embedded in a dry white pulp, but some fruits contain loose seeds so that when detached from the plant a basal hole allow the seed to escape.

The altitude makes us a little breathless as we climb up, passing numerous grass tussocks and bushes up to one metre high. Here we also find compact cushions of a different *Tephrocactus*, *T.sphaericus*, which we feel is at a high altitude for this species. It is growing in the sandy ground between the stones. The nearly spherical segments are up to two inches (5cm) thick, much larger than those on the *T.crassicylindricus* seen earlier. They had a nice smooth epidermis with no obvious wrinkles, giving the impression that they had started into growth. But of course the general appearance of all the vegetation now suggests that there is more moisture in this area. Whilst we stop here to eat our packed lunch, a shepherd comes by with a herd of llamas.

Now we continue along the road taking us towards Cotahuasi and when we are above 4000m altitude we start to see the green, compact cushions of *Llaretia*, growing only 10m or so apart from one another. they have thousands of tiny, close-packed heads and lots of small yellow flowers. We stop in order to look at them and find some *Austrocylindropuntia floccosa* as well. Climbing steadily towards the volcano in the distance, we make another stop at 4410m altitude, finding both *Austrocylindropuntia floccosa* as well as *Tephrocactus ignescens*. Looking closely at the uppermost segments of the *T.ignescens* they appear to have some new spines standing upwards and outwards at the crown which are brownish in colour and barely half the length of the long white spines on the lower parts of the same segments. When we detached a segment, there were also some tiny leaves to be seen at those uppermost areoles.. All suggesting that these plants had started into their new season's growth. Looking up the hillside we could see among the stones and tufts of grass, the woolly tops of the *Austrocylindropuntia floccosa*, a pace or two apart from each other in some places and a stone's throw apart in others. Looking closely at them, the body of pale yellowish wool could be seen covering each individual stem. A number of these plants which we looked at closely were in flower, the flowers only just protruding up out of the wool. On the same plant the flower colour varied from orange to reddish so possibly the flower colours change during the few days that the flowers are open. Continuing round the Nevada Coropuna, we stop at the highest point on the road at 4670m where we are too high for cacti, but there are some llamas grazing on the gently sloping hillside which is predominantly covered with tufts of grass.

The road then starts to descend and after some time we reach the edge of the canyon, from where we can look down into the valley and see the town of Cotahuasi. On the descent into the valley we see *Tephrocactus ignescens* in flower, with red flowers. Then, further down into the valley, on a steep hillside by the road which was rocky but with quite extensive vegetation of grasses and small bushes, we find some *Austrocylindropuntia subulata*. Also a *Trichocereus* which has good strong spines and areoles well spaced out along each rib. There were buds on these *Trichocereus*, mostly just starting to develop and a few flowers which looked quite small but that impression may be because they had nearly closed for the day.

After an overnight stop at Cotahuasi, we take the road going upstream, following the river in a narrow valley between steeply sloping sides. On these slopes we see *Trichocereus*, *Armatocereus*, and a *Puya* species. Then at 2770m altitude, before we reach Alca we catch sight of two large plants of *Weberbauerocereus rauhii* growing on a gentle slope, each with dozens of branches. But as we ascend this slope on foot, this mountainside quickly becomes steeper and more and more difficult to climb, so that it is only possible to get to the lower rocks with difficulty. But here we meet with more large plants of *Weberbauerocereus rauhii*, which have their areoles very closely spaced along each rib as well as a coat of numerous fine spines. They have flowers of a distinct "S" shape, with the exterior of the tepals a reddish brown colour. But we were not able to find an open flower, so that we could not confirm Backeberg's "creamy-brown" flower colour. On the same slope there were also *Armatocereus matucanensis*, large plants with fruits. Together with more of the *Trichocereus* that we had already seen earlier on this route - but they were not numerous. They had many branches up to 3 or 4 m. high, which may not be their normal mode of growth but the result of human activity for firewood. There were also sprawling plants of *Corryocactus quadrangularis*, which were hanging down the steep, rocky parts of the slope.

Finally, at 4170m altitude, we came to a very steep slope which faced north-east, with plenty of grass tussocks and a few little bushes up to 50cm high. On account of its rocks and its steepness it was only partly accessible, making it very difficult to climb. But *Austrocylindropuntia floccosa* was seen here again, but now in company with *Lobivia pampana*. The smaller plants of the *Lobivias* had heads of about 10cm or so across. The central and radial spines were similar in size and stoutness, with three central spines and 8 radial spines disposed 4 to each side. Only one or two flower were to be seen, of a reddish colour, which had been eaten and damaged. There were also a few unripe fruits, reddish-brown in colour with large scales and some wool. The larger plants had heads of about 10cm or so across and formed clumps of 30 or even 40cm across. The largest *Lobivia* seen here were a clump of half a dozen heads roughly 30cm tall, the lower half of their bodies being denuded of spines, but they were inaccessible due to the slope.

The *Austrocylindropuntia* were probably just a cushion of pale yellow wool in the dry season, but now the fresh growth of about 2 inches (5cm) long on almost every one of the uppermost segments stood up out of this woolly cushion, evidently in full new season's growth. On the new growth there were very obvious little green leaves at the new areoles, but little or nothing in the way of spines or fresh wool. Looking down into the last season's wool there were yellow fruits to be seen as well as some new buds and a few flowers. Plainly these plants had been in growth for a week or two (or more) prior to our arrival there, so as we climbed further into the Cordillera we had seen the change from dormant, wrinkled segments on the *Tephrocactus* in the Rio

Majes valley, still in their dry season, to those in full growth at the furthest point of our travel beyond the Rio Majes.

During our drive from Camana to Cotahuasi there were no significant clouds to be seen, just clear blue skies with a few wispy clouds, certainly not the rainbearing sort. The lower part of the Rio Majes was so dry that it might not have seen rain for months, or even years. In general terms it was less arid the further inland we travelled and certainly fairly green for the altitude at Cotahuasi, but I did not find out when was the last time that it rained there.

Now it was time to retrace our route, back down to the coast via the Rio Majes valley.

(The area covered by the above account, between Camana and the upper Rio Cotahuasi, is shown on the South Peru map)

.....from R.Ferryman

During my travels in northern Chile I did see some *Browningia candelaris* in fruit along the road running inland from Arica. We threw up some stones to dislodge one or two fruits as there were none to be seen lying on the ground around these plants. But at both places where we saw *Browningia* there was no sign of flowers.

.....from M.Williams

In the course of our visit to southern Peru in early November we were travelling from Tacna to Tarata when we came across some *Browningia candelaris* which were without any flowers but they were in fruit. We had the impression that the fruit had only recently been set as it was similar to the drawing of the fruit in Britton & Rose, with the scales almost covering the fruit. It was suggested by my travelling companions that the plants might have been in flower in September.

It was towards the end of November when we were in the Nazca valley en route to Puquio, when we again came across *Browningia* in fruit but on this occasion the fruit was larger and appeared to be nearly ripe. There was no fruit to be seen lying on the ground close to these plants so we resorted to throwing stones to knock down some fruit. None of the fruit appeared to be split.

.....from P.Hoxey

Fortunately we did find some fruit lying on the ground around a number of the *Browningia* which we saw on the road to Chuquibamba. Under one plant (pictured on the front cover) there were as many as ten to fifteen fruits lying on the ground under its branches. All those we saw on the ground were still green, none of them split, but showing signs of having been nibbled by some animal.

.....from C.Pugh

We saw *Browningia candelaris* at various places both in Peru and in Chile, including those at the northernmost location not far to the south of Lima. It was at this last place that we saw only one *Browningia* which had a single flower and some fruit. This was the one and only occasion when a flower was seen on these plants. I have the distinct impression that the mature *Browningia* were tallest in the north of their distribution area but there seemed to me to be a gradual reduction in their height the further to the south we saw them. It seems that Ritter decided to give a different species name to the taller forms in the north. In addition, the fruit seemed to be smaller the further to the south we saw them. One fruit was brought back home and was weighed at nearly six ounces. The fruit tastes like a Cape gooseberry.

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

*Browningia icaensis* differs in respect of its height of up to 7m compared with up to 5m. for *Browningia candelaris*.

...from R.Mottram

Britton & Rose in their Vol.2 say of *Browningia* "fruit becoming naked by the falling away of the scales" but I do not think that this is correct.

.....from H.Middleditch

In Britton & Rose Vol.2 there is a picture on p.64 of a *Browningia* fruit where the scales are appressed to the fruit and they appear to cover the whole of its surface.

.....from R.Mottram

A similar picture of a *Browningia* fruit which was taken by Rauh, appears in the 1965 Krainz "Die Kakteen".

.....from G.Charles

The picture which I took of the fruit of a *Browningia* appears on page 42 of the BCSJ 18.(1) and the scales do lie up against the outer wall of the fruit.

...from P.Hoxey

During our trip along the Rio Majes valley, a close-up picture was taken of what looks to be ripe fruit on one branch of a *Browningia*, where the scales can be seen standing away from the fruit.

.....from F.Vandenbroeck

It was in July of 1981 when we were following the ascent from Nazca to the Pampa Galeras where we saw *Browningia* carrying large numbers of buds, flowers, and withered flowers, but this was the only occasion when I saw these plants in flower.

.....from H.Middleditch

Looking at the pictures taken by P.Hoxey of the *Austrocylindropuntia floccosa* which he saw in flower, these include several good close-up shots of the flowers. These flowers do not open their petals wide as they appear to be prevented from doing so by the surrounding body of wool - but the petals are either upright or a little wider open. In one of the two close-up pictures of the yellow flowers, the stamens are curved towards the style with all the anthers nearly touching the style, and the stigma lobes are closed. This would suggest that the flower has only recently opened, possibly its first day open. In the second picture of a yellow flower. the



stamens are standing more or less upright, spread over the flower opening, suggesting that this flower has been open for a day or two. The flower colours are not absolutely an identical yellow, but very nearly so. Nor does there appear to be any obvious sign of withering on the red flowers which might be expected if they had changed from yellow through orange to red whilst they have been open. Whether the flowers are red, orange, or yellow, they give the impression that they are in a good condition. Flowers of this range of colour are only an inch or two apart on the woolly clumps which give the impression that they come from one and the same plant. Does this happen with this *Austrocylindropuntia* in cultivation?

.....from K.Gilmer

Travelling through southern Peru, almost all the floccosas we found in flower had pure yellow flowers although very rarely there were odd plants with orange instead of yellow flowers. On the other hand, over the more northern distribution of this species, in the western Cordillera to the north and south of Lima, as well as around the area of the Cordilleras Negra and Blanca, these floccosas had red flowers. But in the upper Rimac valley we found floccosas with red flowers and on the other side of the Ticlio pass from around La Oroya to the area of the Cerro de Pasco, nearly all the floccosas had yellow flowers. Perhaps the flower colour relates to the preferences of the most significant pollinating agent?

Although I do cultivate numerous different clones of floccosa, unfortunately none of them have flowered in the greenhouse up to now.

.....from J.Arnold

On an excursion from the city of Arequipa we headed out west towards the Colca canyon. At a stop near the railway station on the Pampa de Arrieros we came across some clumps of *Lobivia pampana* at their Type locality, growing on gently sloping ground, amongst large rocks, in company with cushions of *Tephrocactus bolivianus* and tussocks of grass and scattered dwarf shrubs. Some of these *Lobivia* had individual heads of 5, 6, or even 7 inches in diameter, possibly slightly taller than broad, well spined plants with very long centrals. Some of the clumps had about ten heads.

Some two km further on, on a small rounded hill, and growing on steeper slopes amongst rocks, we came across an even bigger and very dense population of these same *Lobivia*, all of them in flower so that the hillside on which they were growing was a mass of orange and red flowers. Most of them had many open long tubular flowers with pointed flower petals. Further on still we continued to see these same *Lobivia* here and there, most of them growing flattened so that they did not project very far above the surface of the ground. Now they were growing on flatter areas and plants were fairly well spaced out, where most of them appeared to be dry and were not in flower.

.....from M.Williams

Travelling out from Arequipa in the direction of Yura, we came to the first group of *Lobivia pampana* in flower. Some of them had red flowers, others had deep orange flowers which were of a pinkish colour on the exterior of the outer petals. Much further along the same road, another group of these plants in flower, here with the outer petals of a red colour but the innermost petals were orange. And then some more in flower with orange-yellow petals with pinkish tips.

.....from H.Middleditch

A picture taken by P.Hoxey not far from Cotahuasi of a clump of *Lobivia* did not have any identification at the time of its receipt. This clump seemed to comprise about half dozen or so upright stems which were exposed on the downhill side and to judge by the solitary wilting red flower they might have been not quite a foot high and less than half that in thickness. They presented a rather peculiar appearance - from the base up to about three-quarter height the pale grey-brown looking stems had been completely denuded of any spines whilst a fairly dense coat of pale, straight spines covered the top of each stem. The areoles could hardly be even two cm apart and they could have easily had a good two dozen or more ribs. By comparison, other pictures of typical *Lobivia* taken at the same time at the same location displayed green bodies which appeared to be flattened globular, growing not far above the surface of the ground, and despite giving the impression of being several inches in diameter they had not many ribs, only two or three areoles per rib, with fairly long spines and not many spines per areole, so leaving the green bodies almost fully exposed.

.....from R.Mottram

The name of *Lobivia mistiense* should be considered together with *Lobivia pampana* - they are quoted as synonymous in the Rausch *Lobivia* 85. The original description for *L.mistiense* by Werdermann and Backeberg appeared in *Neue Kakteen* for 1931, where it was accompanied by a photograph of a plant in cultivation. From its appearance, the plant in this picture gives the impression that it is an imported specimen that has become established in cultivation. The top third of the plant looks as though it is new growth in cultivation, which displays a shorter and more open spination than the habitat spination on the middle third of the body. But the lowermost third of the body is totally devoid of any spination, just like the lower portion of the body on the picture taken in habitat by P.Hoxey. So it would appear to be quite acceptable to identify that particular plant as *Lobivia pampana*.

The picture of that plant was quite interesting as I have not seen any thing quite as extreme as that before in a *Lobivia*. I suspect that it might be just an ageing process. Spines often become detached from the corky bases of old plants. It is interesting, though, because it does illustrate that the globular *Lobivia* (and *Echinopsis*) have determinate areoles i.e. ones which are not capable of regrowth, compared with *Trichocereus*, where the areoles are quite definitely indeterminate and can keep producing new spines at the base for ever. That is a quite useful and significant diagnostic characteristic that could be used to distinguish the two genera, other than just by the less significant stature of the stem. In cacti, the presence of indeterminate areoles is a primitive character, whilst determinate areoles is a derived character.

.....from M.Lowry

Travelling out from the city of Arequipa we passed the small rail station near Pampa Arrieros on the road to Chivay. Stopping to look round, we came across some *Lobivia pampana*, a lot of them growing amongst rocks. When I pulled a few rocks away from a clump of these *Lobivia*, I was quite surprised to see that the lower 2 or 3 inches of the stem were quite spineless. Rather like the plants in the photo taken by P.Hoxey - maybe this plant had previously been surrounded by rocks?

.....from P.Hoxey

We had been travelling inland north of Cotahuasi all the morning and when we were past Puyca we had reached the considerable altitude of 4060m. We were about to turn round and retrace our route for some way. Here, the road was running along a very steep mountainside and there were no cacti in view, but we decided that we might as well take a look round whilst we were here. This north-east facing slope was so steep that we had to be careful in picking a spot to climb up some way and then work slowly across the slope, largely following a contour. There were numerous patches of rocky outcrops, several metres high and more or less vertical, which had to be avoided. Between them the steep slope was covered with grass and other low growing vegetation, but no shrubs. Here and there we could glimpse some of the taller plants of *Lobivia* among the grass, but mostly they were quite inaccessible on account of the steepness of the slope. But we also found some *Lobivia* with nice green bodies several inches across which projected only an inch or two above the ground, partially shaded by the surrounding grasses. There could have been a large number of these on the slope but we could only see them when they were almost under our feet. All these *Lobivia* appeared to be growing in pockets or patches of soil in the rock.

We were able to take a picture of one clump of taller growing *Lobivia* which was accessible and also exposed to view. The plants in this clump had spines only on the uppermost part of their bodies, most of the stems being spineless. The areoles were close pitched so that their crowns were effectively obscured by the spination. Perhaps they had been damaged by fire? By comparison, the very low growing *Lobivia* had green bodies, and very well spaced areoles with long central spines, the spination being very open indeed. The appearance of these two forms was so different that they gave the impression of being two quite different species - indeed possibly of being two quite different genera, although the flower remains and the ripening fruit identified them all as *Lobivia*.

From here we turned round to go back down the road and shortly we passed a less steep hillside which had numerous rock outcrops, on which we failed to find any *Lobivia*. Returning to Puyca and then to Cotahuasi we did see *Lobivia* on several near-vertical slopes which were quite impossible to climb. The *Lobivia* in this area did appear to prefer this type of habitat, although extensive agriculture may have destroyed more favourable slopes.

.....from H.Middleditch

There is a record of *Lobivia madrigalensis* n.n. KK 1137 from Madrigal, in the upper reaches of the Colca canyon, which lies some way to the west of other recorded sightings of *Lobivia pampana*. But the spot where P.Hoxey came across *Lobivia*, does lie closer to Incuyo - near Laguna Parinacota - than to Madrigal and is certainly even further away from what appears to be the recorded distribution area for *Lobivia pampana*. Consequently the *Lobivia* seen by P.Hoxey may possibly be *Lobivia incuiensis*. The very useful drawings in Rausch *Lobivia* 1 show clearly that on *L. incuiensis* the lowermost part of the flower (and the fruit) carries spines at the areoles, which is confirmed in the text, whilst *L. pampana* does not have spines on the ovary. However, it is not clear if *Lobivia incuiensis* has the short, narrow flower with short petals as compared with the longer and more wide opening flower on *Lobivia pampana* which are very evident from the drawings. The habitat of *Lobivia incuiensis* is stated (page 8, Rausch *Lobivia* 1.) to stretch westwards from Lucanas to Incuio, whereas Incuio actually lies to the east from Lucanas. But is this perhaps an error of translation?

.....from A.de Barmon

The fruit on my *L. incuiensis* was very woolly and it might have hidden any short spination, as I did not notice any. By comparison, the fruit on my *L. pampana* certainly did not display any spination and was quite bare of wool. I am quite puzzled by the pictures of the fruit seen by P.Hoxey on the *Lobivia* found near Cotahuasi. The absence of spines on the pericarp would point to *L. pampana* but the large scales on the fruit do not appear on the fruit of my own plants, such as the WR433.

.....from H.Middleditch

The difference in size of the scales and the amount of wool on the fruit of *Lobivia pampana*, as noted by A.de Barmon, may perhaps reflect the natural variation to be seen within this species.

.....from J.Arnold

Almost all the *Lobivia pampana* which we saw in southern Peru were growing in clumps and I was quite amazed to see how large many of these clumps were - up to about three feet across, with individual heads up to as much as 5 inches across and with very long spines. In contrast the *Lobivia tegleriana* which we saw both before and after passing through Puquio were almost all solitary, with only rare exceptions. None of them grew tall like the *L. pampana* but were broad and flat close to the ground, some of them even up to eight inches across the body. It was surprising to see such large plants as those in my own collection are far smaller. Also I have never seen the flowers on my own *L. tegleriana* really wide open and the flowers we saw in habitat did look similarly not wide open. Those flowers - of a fairly uniform pinky orange colour - are considerably smaller than the flowers we had seen on the *L. pampana* which displayed red flowers.

We did see the odd one or two *L. tegleriana* with offsets, one with two offsets and a white flower.

...from A.de Barmon

The flowers on all of m *L. pampana* and *L. tegleriana* do not open fully and those of *tegeleriana* are definitely smaller than those on *L. pampana*.

.....from R.Purslow

All of my *Lobivia tegeleriana* and *L. incuiensis* are solitary, but I do have a *L. pampana* obtained from K.Preston-Maffham which he grew from habitat collected seed, which has generated quite a few offsets.

.....from H.Middleditch

In view of the foregoing observations it would appear that the clumping *Lobivia* seen by P.Hoxey are very probably *L. pampana*. However it is rather surprising to find in his *Lobivia* 1 2 3 that Rausch states that *L. pampana* "grows mostly single headed" whilst *L. tegeleriana* is "globular solitary rarely offsetting". Then in his *Lobivia* 85 Rausch observes not only that *L. pampana* is "solitary occasionally even sparsely offsetting" but also applies exactly these same words to *L. tegeleriana*. Has he seen quite a number of populations of these plants in various locations over a wide area which lead him to make these observations?

.....from P.Hoxey

The fruit on the *L. pampana* grown by A.de Barmon are very nearly naked, which is quite different to the fruit seen on the *Lobivia* above Cotahuasi, which were woolly with large scales. Can these two really be the same species? When comparing the illustration of the fruit of *L. pampana* in *Lobivia* Vol.1 by Rausch with the fruit I saw on the *Lobivia* near Cotahuasi, the latter is much more woolly and has larger scales. Could it be an extreme form of *L. pampana*?

.....from H.Middleditch

Or simply a reflection of the degree of variation that occurs naturally in the size of the scales and the amount of wool on the fruit of this particular *Lobivia*?

There does not appear to be any reference in the literature to the route from the Rio Majes to Cotahuasi being travelled by any cactophile prior to the visit made by W.Rauh. There were subsequent visits to this route made by Johnston and then by Hoffmann, all quite some years prior to the visit made by P.Hoxey. The recorded sightings from these trips of which sorts of cacti were seen where, and at what altitude, correlate well between the Rauh and Hoxey records, but there are questions to resolve for the other two.

Also, why does Rauh (in his Peruvian Cactus book) quote - on his page 128 - that *Trichocereus* occurs in a zone from 3800 to 4000m altitude, whilst Backeberg - on page 363 of the same book - states that *Trichocereus schoenii* is to be found between 3500 and 3800m altitude?

It is observed by P.Hoxey that the fruit which had fallen to the ground from the *Browningia* appeared to have been nibbled by some animal. This might not be too surprising in view of the apparent paucity of other foodstuffs for any animals living in this area. Would the fairly thick-walled fruit to be seen on the *Oreocereus* with the seed embedded in a white pulp also serve in this way? Or does the seed trickle out from the fruit before the fruit falls off the plant? Or is it removed by the ants before the fruit falls off the plant? And what happens to the ripe fruit on the *Corryocactus* - does it split on the plant or does it fall off before it splits? And since neither fruit nor flowers appear to have been seen on the *Haageocereus*, when do they flower and what are their fruit like?

## **JUST A LITTLE TEPHROCACTUS From C.Pugh**

Travelling up the Quebrada del Toro, we passed Puerta Tastil and stopped not long before reaching Santa Rosa de Tastil. Not far from the road, more or less on the valley floor, we saw literally one or two plants of *Pyrrhocactus umadeave*. On the north side of the road the ground rose at a moderate gradient which posed no difficulty for us to walk up, but here there were only a few *Pyrrhocactus* to be seen. There were a few scattered dwarf shrubs, about knee height, odd tufts of grass, and a faint scattering of herbs, but very little of this vegetation was green. In the course of our travels through northwest Argentina this year, we gained the general impression that the Spring was cool and late - a general lack of greenery for the time of year as well as cacti that we expected to find in flower mostly barely starting to bud up.

We walked up the rising ground lying between the Tastil and Toro valleys, probably for a km or two. For practical purposes we did not see any rocky outcrops, the ground being made up mostly of sand, grit, and stones, but no real boulders. We passed several open sandy areas which might even be described as dusty, where we suspected that the guanaco had been rolling and enjoying a dust bath. On some of the more sandy patches we could see some slight, small depressions in the surface of the ground and on investigation we found that these were caused by small plants of *Lobivia chrysantha* which had evidently shrunk down until the whole plant was a few mm below the general ground level.

At a number of places in the course of this climb we came across specimens of *Tephrocactus mandragorus*, whose segments were typical in form and of the usual reddish-brown colour which we expect to see for these plants in habitat. These plants did seem to have a preference for growing in certain patches of ground which evidently suited them so they were rather sparse between those patches. Here and there we did see the occasional plant of *T. mandragorus* with segments having remarkably long, robust spines. Indeed we even saw a plant or two which displayed both segments with this robust spination and segments with the wispy spination commonly associated with *T. mandragorus*.

Roughly at the point where we decided that it was time to retrace our steps and join the other members of the party back at our vehicle, we found ourselves on a flat but gently sloping area of ground where we came across what we took at first to be a shrivelled specimen of *T. mandragorus* growing in a very stressed condition. Like almost all the *T. mandragorus* we had seen, the plant consisted of only a fairly small number of segments, but this one would be only some 5cm across the clump of heads and formed a very low hummock indeed. The segments themselves were about 10mm in diameter. They were not only smaller than those we had seen here and there on the *T. mandragorus* when walking up this slope, they were also packed more closely together. My



recollection of the spination is that it was insignificant, but the segments were so small, compact, and dust covered that it would have almost required a magnifying glass to make out the nature of the spination and whether there were any glochids at the areoles. After finding a few more of these plants it was mooted that they had an appearance somewhat reminiscent of *Tephrocactus conoideus* growing in its own habitat in Chile.

None of these plants were to be seen either in bud or in flower. We found only two small, very new buds on the *T.mandragorus* and one or two new, very tiny buds on *Lobivia chrysantha*.

.....from M.Lowry

Travelling along the Quebrada del Toro, we turned of to pass through Puerta Tastil and then followed the Rio Toro valley. A few km to the north of Puerta Tastil, where the road was running along the hillside some 10 to 20m above the narrow floor of the valley, we decided to make a stop in order to search for *Lobivia chrysantha*. The hillside sloped up from the road, perhaps at about a 25° slope. It carried very little vegetation apart from a few *Trichocereus pasacana*, more of these columnar plants being seen on the hillside at the other side of the dry river bed. There were also some knee-high shrubs which grew roughly a stone's throw from one another. Compared with other stops that we made whilst we were travelling up the Quebrada del Toro, this spot was fairly barren. The *Parodia stuemeri* were slightly columnar - we might have seen a couple of dozen of them at the most during our one-hour walk round here. The *Gymnocalycium spegazzini* were also very sparse, flattened close to the ground, six inches across at an absolute maximum. There were far more of these *Gymnocalycium* to be seen, and in a healthier looking condition, when we stopped near Golgota, lower down the Quebrada del Toro. Even the *Pyrrhocactus umadeave* were not obvious, being about basketball size, whereas those we saw near Las Cuevas, further up the Quebrada del Toro, were three times that size. Nor were the *Lobivia chrysantha* other than sparse. Of all the cacti, only the *Lobivia* were showing buds - none of the others were in bud, flower, or fruit.

The ground here was made up of a totally unconsolidated mass of sand, gravel, and rounded stones which were only rarely up to about football size - it was evidently a large, but old, alluvial deposit which had been washed down into the valley by one or more of the very occasional heavy downpours. We were only 20-30m from the road when we saw the first plant of *Tephrocactus mandragorus*, but during our walk round here we saw only about a dozen of these plants, well dispersed. They were not very obvious as they consisted of only 3 or 4 joints standing above the ground, of a deep reddish brown colour and obviously sadly lacking any water - the wet season not yet having started, so again, neither buds, flowers nor fruit. Their segments carried only a few short, weak, thin spines more or less appressed to the body.

On the occasion of a later visit to this area, we went a few km further up the Rio Toro valley, making a stop at a spot which again gave the impression of being an alluvial fan, made up of similar ground to that at our earlier stop, but much less steep and lacking any tall *Trichocereus*. Once again we found *T.mandragorus*, but here the plants were now rather less sparse than at our earlier stop and here they formed low cushions, only one or two segments high, but up to as much as about 15cm across. Here, the uppermost areoles carried a couple of dagger-shaped spines of about 3cm long which lay roughly parallel to the ground. Again, neither fruit nor buds were to be seen, only one single withering flower which looked as if it might have been open on the previous day.

.....from H.Middleditch

This excursion would very probably follow the initial part of the route taken by Fric from Puerta Tastil going via Abra Palomar to Moreno, on the altiplano.

.....from A.V.Fric, *Lovec Kaktusy*

I used the not yet completed railway line that will connect Salta with Chile ..... arriving at Puerta Tastil. ... I took advantage of the opportunity to join a caravan of carts which was going to Salinas to fetch salt. And so I came to Toro, which lies at 4000m altitude.

.....from Baron E.Nordenskiold, *Travels on the boundaries of Bolivia and Argentina*, Geographical Journal, May 1903

On May 12th Fries, Bowman and I arrived at Salta, chief town of the province of the same name, having 16,000 inhabitants. We at once set about our preparations, engaging servants, procuring mules, provisions, etc. We left Salta for the Puna de Jujuy; We chose the route through the Quebrada del Toro. These quebradas leading to the tableland are of a peculiar character. The rich vegetable life of the lower regions reign a part of the way, but by degrees the landscape becomes monotonous, columnar cacti being seen in vast numbers. Our headquarters were made at Moreno, about 11,500 ft above sea level. The vegetable formation is a "puna", a dry high-lying plain with low bushes. The central point of the puna contains a large salt lake. The central parts of this salina consists of common salt, while the outer parts, at any rate on the east side, are of borax. The salt crystallises into visible layers, from which the puna indians hew out blocks of about 25 kgs in weight, two of these forming the ordinary burden of a donkey. These puna indians then take the salt to the valleys, for sale.

.....from H.Middleditch

Evidently this trade in salt was still being undertaken in 1929 when Fric joined a caravan of carts to go from Puerta Tastil in the Quebrada del Toro to the Salinas. The only practical route for this trade was along the valley of the Rio Toro and then via the Abra de Palomar. In the accounts of the travels made by Fric there is no reference to his making any collection of *T.mandragorus*. But, in his *Die Cactaceae* p.351, Backeberg states that *Tephrocactus mandragorus* was first collected by Fric, the habitat location being unknown to Backeberg at that time.

.....from K.Gilmer

Travelling up the Quebrada del Toro we went past the side road going off to Puerta Tastil, which lay about half a km away. Shortly after that turn-off, when we were at about 3,000m altitude, we decided to stop

and have a look round. Our road was running along the north flank of a valley with a dry river bed at the bottom. We walked down to the river bed and then climbed up the opposite hillside, which sloped at a fairly moderate gradient. The mostly bare ground consisted of sand and gravel with larger stones of up to about head size, with scattered shrubs of about 80cm tall, some low growing herbs, and very little grass. It was here that we found some plants of *Tephrocactus mandragorus*, which were not very numerous - it was several paces between one plant and another. Because of the size of the plant and the colour of the segments, it was not easy to find. Most of these plants consisted of only a few segments, projecting just one segment high above the surface of the ground. The largest plant we saw consisted of only 8 segments. The segments are egg-shaped with a rather pointed top, some 20mm diameter and 30mm high, and are a red-brown colour. Most plants had only a few short spines, perhaps 4-8mm long, mostly projecting downwards and pressed closely against the body of the plant. Other plants had a fairly robust central spine perhaps 25mm long but only one spine per areole.

We saw two or three plants in bud but none with open flowers. We were fortunate enough to find some fruit with ripe seed on these *T.mandragorus*, which germinated quite well back home. They have now grown into quite nice plants and flower well - so well that one plant with only three new segments has over a dozen flowers. When the fruit ripens on these plants it very quickly dries out and releases the seed.

We continued to walk uphill for a further 100 to 200m when the slope became much steeper and then there were no longer any *Tephrocactus mandragorus* to be seen.

....from C.Hukeler

We came across *Tephrocactus mandragorus* in the valley of the Rio Toro not far from Santa Rosa de Tastil, quite close to the road. It can be found on flat hillsides and in dry river beds but never on a steep hillside. They can be growing under shrubs as well as in full sun. It is quite difficult to see these plants when they are dehydrated and shrunken, and have turned to a red-brown colour. I have seen plants with a heavy spination like *T.glomeratus* and absolutely spineless, on the same square metre. When I sow seeds of this species, The seedlings are very woolly at first but by the time they are three to four years' old they have a good spination.

....from H.Middleditch

The field trips to many parts of South America made in the last few decades has brought to light more and more information about where various species of cacti are to be found, so that nowadays we have a far better knowledge of the apparent distribution area for a great many species. Looking at this situation, it may have seemed to be rather unusual that *Tephrocactus mandragorus* appears to be found only at one locality in the Quebrada del Toro. But we now know that it is also to be found in mid-western Argentina, along the road from Fiambala to Chile. Two relatively compact locations separated by a considerable distance. How might this have come about?

A possible explanation is to sought if it is born in mind that the nitrate mines in northern Chile were located in virtual desert surroundings. As in Argentina, beef was a basic foodstuff for the miners at these establishments - but the only practical source of that beef was the cattle ranches on the lowlands of the Chaco, right on the other side of the Cordillera.

## **DESERT TRAILS OF ATACAMA By I. Bowman American Geographical Society 1924.**

### **The cattle trade from the Chaco country to the Nitrate Desert.**

Some of the long-horned cattle from the Chaco country are driven for great distances from the grasslands of the Chaco, before they are transported by rail to Salta. After being fattened in the cornfields and alfalfa meadows of Salta the cattle are gathered in troops of 50 to 100 each and under the care of drovers are taken first over the lower ranges of the pre-Cordillera. Some difficulty is experienced on the gravelly cactus-dotted alluvial plains and basin floors that lie between Salta and the mountain wall of the lofty Puna de Atacama. The trails however are selected so as to make the best use of such water and grass as the region affords. They strike the irrigated tracts in the valleys along the eastern border of the mountains where the cattle may be rested and turned into fresh pastures to be well fed before the onward journey. In these high valleys the cattle also become somewhat accustomed to the altitude and the cold, for the climate here is temperate instead of subtropical as in the Chaco from where they have come.

Once prepared for the journey, they start the climb of the eastern mountain wall of the lofty Puna de Atacama. It seems at first an incredible feat that they are required to perform. The trails are stony and steep, and at the end of two or three days at the most the droves of cattle find themselves upon the bleak, windswept puna where only the coarsest grasses and widely scattered watering places may be found. Finely bred stock would perish at once; but these hardy beasts are able to go two or three days without water, as they must in the most difficult sections of the puna. They travel only about fifteen miles a day.

The cattlemen, skillful as they are, find difficulty in the worst places in keeping the cattle going. This is chiefly because of the wind. In the Gran Chaco, whence the cattle have come, the southeast wind prevails. It is a soft, warm wind and affects the cattle but little. On the puna de Atacama, however, the northwest wind prevails. Though the mornings are calm, the wind rises to gale strength in the late forenoon and by mid-afternoon it is blowing with great violence, carrying sand and dust in considerable volume and weakening man and beast by its great force and low temperature. To keep the cattle together and not to lose ground by having them run before the wind is often a difficult task, though it becomes less difficult as the western border of the mountains is reached. Thus they arrive at the western crest of the cordillera, and begin the long descent towards the desert settlements, particularly that of San Pedro de Atacama.

It takes thirteen or fourteen days for cattle to be driven from Salta to San Pedro de Atacama. They wait at San Pedro one or two days, according to the need for beef at the nitrate establishments. In this time the cattle are fed liberally. From San Pedro it takes three days to drive them to the nitrate establishments and the men return in two days more. The men carry some alfalfa and dry barley with their mules, and at Soncor they have to pay for the feed for their horses, which is one reason why that settlement has been long maintained.

Senior Alvarez, who is one of the chief men in the cattle business at San Pedro, has furnished me with details of the principal cattle route across the Puna - from Salta via Quebrada del Toro, Tastil, Catua, Guatiquina, Puntas Negras, Aguas Calientes, Pajonal, Soncor, and San Pedro.  
.....from H.Middleditch

It might be reasonable to anticipate that the cattle drovers would return to Salta, with their mules and horses, more or less along their outward route, since that would ensure some vegetation and water for their own animals. For practical purposes, this basically follows the route subsequently taken by the railway line which ran from Salta, through the Quebrada del Toro, via the Guatiquina pass on the Argentine-Chile border, via Talabre, to San Pedro de Atacama. So the cattle drovers returning from San Pedro de Atacama would pass the places where *Tephrocactus conoideus* is to be found. It is unlikely that these plants will be confined to one little spot in that area, and quite probable that they would lie in the path of the returning cattle drovers. Bits of this *Tephrocactus* might have become attached to man, or beast, or clothing, by the spines.

This cattle trade will have been carried on for almost as long as the nitrate establishments existed on what is now the northern coast of Chile (previously part of Bolivia), which started exporting nitrates to Europe in about the mid nineteenth century. It would occasion no great surprise if, over a period of more than half a century, the odd piece of *T.conoideus* had been unconsciously transported from the surroundings of the Salar de Atacama and dropped off en route to Salta. One (or two) of which may have survived and prospered near Tastil. A similar event may well have taken place along the southern route from Belen in Argentina to Copiapo in Chile, yielding similar plants to be found today near Chaschuil.

Which may help to explain why two fairly isolated populations of *Tephrocactus*, both with resemblances to *T.mandragorus*, are to be found at two widely separated locations.  
.....from K.Gilmer

We have paid a visit to the Tastil in the Quebrada del Toro as well as to the region around Chaschuil, both being places where the *Tephrocactus mandragorus* grow. There were similarities to be seen between these plants at the two locations, but also differences. The plants at Tastil have bigger segments than those at Chaschuil, often twice as large. At Tastil the segments are usually blunt whilst at Chaschuil the segments tend to be more slender and acuminate, that is, tapering almost to a point. The plants at Tastil frequently project only one segment high above the surface of the ground, occasionally two segments high and they form small clumps rather than hummocks. The plants at Chaschuil form fairly large hummocks and hence have more segments per plant.

At Tastil there are more segments without distinct central spines than those with - many plants with segments having very short, slender, downward pointing spines at each areole, more or less appressed to the body. Where there were central spines to be seen, these are broad at the base, tapering to a point at the tip, pointing outwards and somewhat downwards and up to about 30mm long. By contrast, at Chaschuil, there are more well-spined plants, some with long slender outward pointing spines, but we did see some plants with quite robust spines, broad at the base and tapering to a point.

At Tastil, most of the plants had segments of a brown colour, whilst at Chaschuil some plants had segments of a brown colour, others with red, or with green segments. We were able to bring back segments from each of the two locations and these have now rooted down and grown on in cultivation, producing clumps, some of which now have up to two dozen segments. But on some plants the spination in cultivation is rather different from that in habitat as many of the ex-Chaschuil plants have slender spines standing out from their areoles, up to about 30mm long. But these cultivated plants are still different from each other but by no means as different as might be expected from seeing the differences displayed in habitat. The cultivated plants that originated from Tastil tend to have bluish-green segments with a blunt tip whilst their new segments tend to be an almost purplish colour.

We are also growing a plant of the so-called *Tephrocactus mandragorus* which displays an appearance that has been widespread in cultivation for a long time. But we do now know that this clone is not really typical for the plants to be found near Tastil, because in cultivation it forms a cushion that is more compact, with segments that are more acuminate and of a bluish colour, compared with our plants that are grown from ex-Tastil habitat segments.

.....from H.Middleditch

The two accompanying pictures which were taken by Rausch near Tastil appear to have green or grey-green segments. In addition, on the plant with the long spines, these appear to be less broad at the base than what may be typical long spines on the brown segmented plant photographed by Hunkeler near Tastil.

.....from K.Gilmer

Most of the plants which we found at Tastil did have an overall brown epidermis and they were usually fully exposed to the sun. But we did find the occasional plant with greenish segments which was growing in the shade of a stone which kept the sun off the plant for some part of the day. The plants in the Rausch pictures could have been growing in this way. But at Chaschuil the clumping plants with green segments were fully exposed to the sun.

.....from H.Middleditch

Of the cultivated plants grown by K.Gilmer which were raised from segments collected at Chaschuil, several have clear green segments and slim outwardly projecting spines. In segment shape, segment colour,



spination and clumping form they seem to be rather like the habitat picture from K.Gilmer in Chileans No.63 which was taken in the area of Chaschuil. Did any of these particular cultivated plants grow from segments which were red, or brown, or more or less spineless when they were collected off plants at Chaschuil?

.....from K.Gilmer

Yes, one or two of my cultivated plants which do have these green segments were raised from segments taken off plants of somewhat similar appearance to that in the picture in Chileans No.63, which did have green segments. But several of my ex-Chaschuil segments which were red or brown with long tapering spines have produced cultivated plants which do have clear green segments and slender projecting central spines whilst other ex-Chaschuil segments have continued to grow into plants with red or brown segments in cultivation.

.....from H.Middleditch

The accompanying picture from C.Hunkeler which was taken near Alfarcito - not far from Tastil - is almost a duplicate of a plant photographed by K.Gilmer near Chaschuil, in having some segments with almost insignificant spines and other segments with long tapering spines.

.....from K.Gilmer

There were also plants with reddish-brown segments and only almost insignificant spines at every areole, only one segment above the surface, to be seen both at Tastil and at Chaschuil. But between these two habitats any similar looking plants were to be seen only in small numbers compared to all the plants which were different between those two habitats.

.....from H.Middleditch

A search of available literature has not revealed any indication that Kiesling was familiar with these forms of *Tephrocactus* that grown around Chaschuil. Indeed, it does appear to be open to question whether he even knew of their existence, If this is correct, then it means that he was only aware of the *T.mandragorus* that have been found in a somewhat limited distribution area in the Quebrada del Toro. Did this mislead Kiesling into putting *T.mandragorus* into synonymy with *T.minutus*?

.....from G.Hole

When Kiesling came to the UK to spend a year at Kew, he brought with him some plants of a *Tephrocactus* which were a form of *T.bolivianus* that were from "Fiambala on the road to Chile". But I am pretty certain that he never went any further beyond Fiambala. If indeed he did collect these plants himself as they could have been collected and given to him by someone else.

.....from H.Middleditch

The *T.minutus* from northern Argentina - even my own cultivated specimens - bear no resemblance whatsoever to the *T.mandragorus* from either Tastil or Chaschuil. The foregoing comments from K.Gilmer echo those in Chileans No.63 regarding the wide range of variation to be seen in the plants growing in fairly close proximity to one another in the area around Chaschuil. It may be as well not to overlook the possibility that this may be because they are a population of hybrids. It is not unusual for hybrids to display a combination of features which are a throw-back to their original parentage. For example, the green-segmented ex-Chaschuil plants cultivated by K.Gilmer do have an appearance not greatly different, for example, from those of *T.conoideus*.

.....from K.Gilmer

My own cultivated plants of *Tephrocactus conoideus* RMF 14 do have segments and spination which is rather similar to my green-segmented ex-Chaschuil plants, but they are certainly not the same.

.....from W.Phillips

Yes I do have a number of *Tephrocactus* which originated from Chaschuil. They display a range of segment colours, some plants having light green coloured segments, others with reddish or brownish segments. Some of these reddish or brownish segments carry only short, insignificant downward pointing spines, but others have quite long, tapering spines from the upper areoles, with a different number of these long spines on different segments of the same plant.

There seems to be ideas abroad that *T.mandragorus* is the same as *T.minutus*. My own provenanced *T.minutus* buds up very early in the year, about January-February time. But as I have little or no heat in the greenhouse I cannot afford to give it water at that time. But about mid-March I do give it water and the flowers open only a few weeks later. My *T.mandragorus* produces their buds several months later than *T.minutus* and the flowers open about mid-June to July. Not only does their flowering time differ, the segments are of quite a different appearance. I am one hundred per cent certain that these two cannot be one and the same species.

.....from R.K.Hughes.

I understand that *T.minutus* comes into flower in habitat before the rains arrive so I avoid watering my two plants until the buds appear - they flower pretty regularly each year. My *T.mandragorus* tend to flower a little later.

.....from K.Gilmer

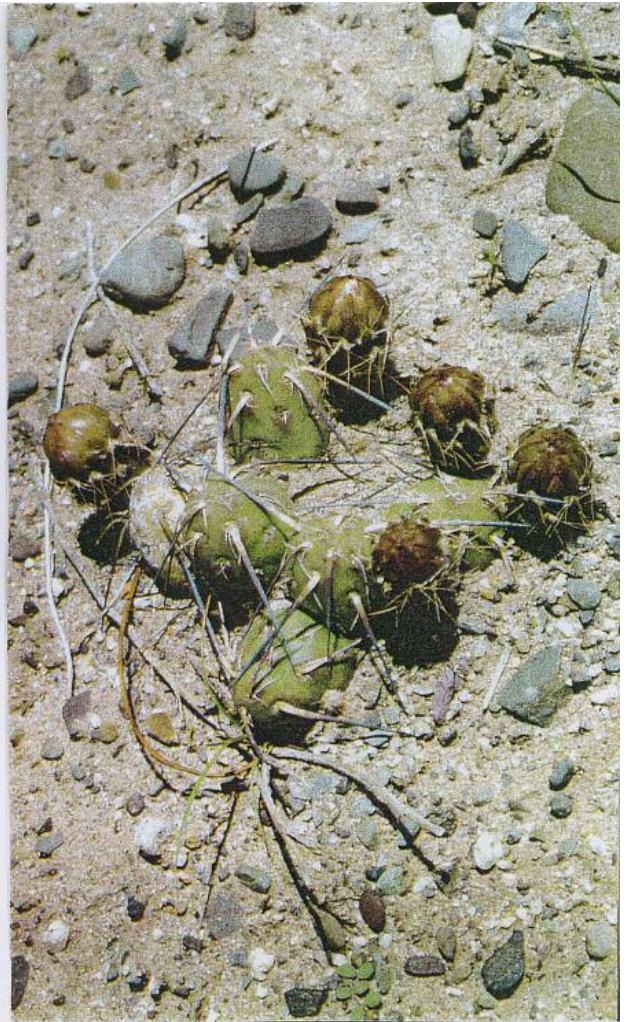
The winter here on the continent is lengthy and usually quite severe with periods of really low temperatures that at best are within a degree or two either side of freezing. The temperature in the greenhouse is kept mostly frost-free but even in March the greenhouse temperature will often be still only a degree or two above freezing, So my *T.minutus* does not put out any buds until about mid-March to April, with flowers two or three weeks later. But my *T.mandragorus* does not produce any buds until late April into May and the flowers open at about the end of May into June. I would say that there will be about 4 to 6 weeks difference in the flowering times.

Also the flowers on *T.minutus* open wide with the petals almost flat, whilst on *T.mandragorus* the flowers are not open as wide but the pericarp is markedly bigger than on the *T.minutus* flowers.

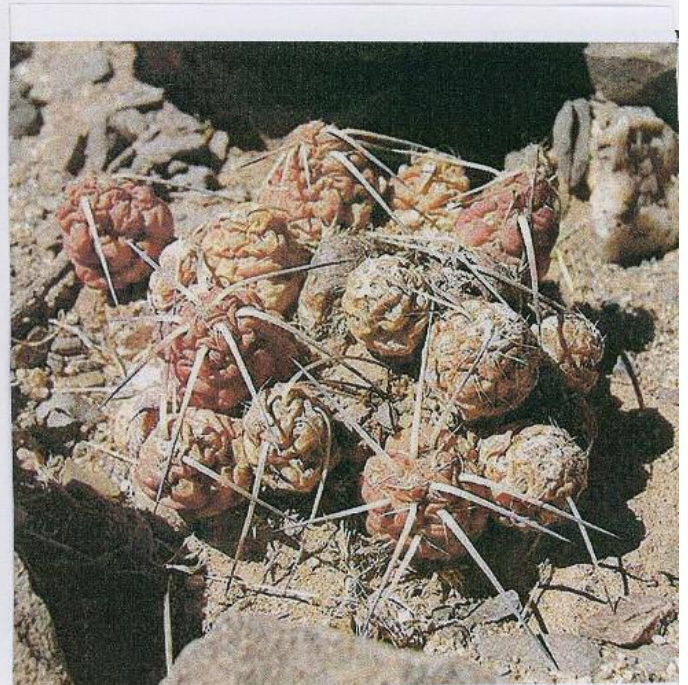




Quebrada del Toro  
Photos:- W.Rausch



Near Chaschuil  
Photo:- K.Gilmer



Quebrada del Toro  
Photo:- C.Hunkeler

## Tephrocactus mandragorus



.....from W.Phillips

Yes the flowers on my own *T.mandragorus* open out regularly into a tea-cup shape. But on one occasion I forgot to open the greenhouse when we had a few days of a summer heat wave and the *mandragorus* flowers did open wide on that occasion.

.....from R.Ferryman

The flowers on my own plants of *T.mandragorus* open out to roughly a tea-cup shape. But if there was more heat trapped in the greenhouse I can well imagine that they would open further - flowers on other sorts of cacti will do the same thing under those conditions.

.....from G.Hole

My own *T.mandragorus* from Chaschuil do open their flowers wide, almost like a pancake. The greenhouse has automatic ventilators, so I would not think this degree of flower opening was due to the greenhouse getting unusually hot. I do remember that we acquired a piece of *T.mandragorus* near Tastil that had a flower which was almost open, which we put in the boot of the car. Some time later we opened the boot to get out a bottle of water and the flower was wide open, no doubt due to the heat.

.....from C.Holland

The *T.minutus* in my own collection have small, green, egg-shaped segments, not globular, having close-spaced areoles each with a small bunch of short glochids - quite unlike the larger segments of *T.mandragorus* which lack any such glochids.

I do have a plant of RMF 14 *T.conoideus* in my greenhouse and I would agree that in appearance it resembles somewhat my green segmented ex-Chaschuil plants, but it is certainly not the same.

.....from R.M.Ferryman

A few years ago I made a stop at Chaschuil where I collected a segment off a *Tephrocactus* which rooted down and grew on back in the greenhouse. In due course it put out a flower, pictured in Chileans No.63. The segments still have the dark epidermis like the plant it came off in habitat. On that particular field trip I was travelling with W.Rausch and F.Kuhas and both of them asked me if this particular plant could be *T.conoideus*. There was certainly a lot of variety in the *Tephrocactus* to be seen at Chaschuil but many of them did appear to display features comparable to *T.conoideus* - low growing clumps, not large segments, heavily tuberous rooted, and I felt inclined to agree with the suggestion of Rausch and Kuhas on the spot. The plants cultivated by K.Gilmer from ex-Chaschuil pieces, which have green segments, could also be *T.conoideus*.

.....from K.Gilmer

The cultivated plants are similar to those in habitat at Chaschuil in having small segments that were approximately 12 to 15mm long and about 10mm in diameter. The spines (mostly one per areole) usually about 10 to 15mm long, standing outward and upward away from the areoles, fairly slender.

.....from H.Middleditch

That segment size is a good match for the segments on my small specimens of the valued plants originally collected by G.Hole between Loro Huasi and Chaschuil, as described in Chileans No.63.

.....from R.Ferryman

The segment size quoted by K.Gilmer for the green segmented plants seen at Chaschuil is similar to the segment size for *T.conoideus* - which are possibly even smaller, but there is more areole wool on *T.conoideus* than on the *Tephrocactus* seen at Chaschuil. The flower buds are identical in form on both *conoideus* and *mandragorus*, but on *mandragorus* the flower bud appears from the very top of the segment, whereas on *conoideus* the flower buds appear from an areole below the top of the segment, and so stand out sideways.

In 2006 our field trip took us along the foothills at the eastern side of the Salinas Grandes. We stopped at various places where we found very compact, low growing clumps of what were probably *T.minutus*. Not infrequently they were growing in the company of *T.nigrispinus*. They had very small globular segments, about 12mm in diameter, and were quite different from the *T.mandragorus* that we had seen previously in the Quebrada del Toro, not far from Tastil.

.....from H.Middleditch

It would seem to be very probable that Kiesling has been mistaken when he placed *T.mandragorus* as a synonym of *T.minutus*.

## **A MYSTIFYING TYPE From W.Papsch**

**Translated by H.Middleditch from *Gymnocalycium* 16.3.2003**

The Acta Musei Richnoviensis is a relatively little known Czech publication, which is published at no fixed intervals. In the course of 1998-2002 a series of plants were described, or new combinations made, by a group of authors in various combinations, partially in an unconventional manner. The plants described or recombined there belong to various plant families, which is clearly evident in the title of one publication - Miscellaneous descriptions 2000. The flood of new descriptions reached a climax in issue 9, dated 2002 but appearing in March 2003. The problem with this flood of new descriptions starts with the forward to this - "In 1996-2001 many new descriptions were published as 'short communications' without any discussion of some significant results. Detailed and elaborate investigations were made and many new descriptions and combinations were made". Among the plants described there, some *Gymnocalycium* are to be found whose validity must be considered.

Similarly there is the question, how anyone can produce descriptions which with hindsight should have first been subject to a "detailed and painstaking research". Should one try to emend these inadequate to fanciful descriptions with additional details? Or even to justify them? Let us first consider the description of

G.lukasikii Halda & Kupcak. This description first appeared in the year 2000 together with ten further descriptions of Taxa from the Cactaceae and 6 descriptions from other plant families, such as Agave, Begonia, and Lonerica, as well as new combinations in the Cactaceae. There was the minimum of data about body form and flower, and no data about fruit. Seed characters were afforded more attention, although even here the data did not extend beyond the usual details. If one compares the descriptions of the cacti, one gained the impression that any research has been confined to only a superficial study of the plants, apparently without any detailed knowledge of the habitat.

In the case of G.lukasikii it was necessary to establish from which of the quoted habitat locations growing plants had been described. In issue No.9, two habitat pictures were provided, as well as a discussion of possible relationships with other *Gymnocalycium*, which could contribute to the clarification of this question.

On the 14th October 1989, in company with G.Hold, I discovered the Type location of this *Gymnocalycium* between San Jose del Morro and La Esquina in Province San Luis. Only three plants were found and recorded under the field number WP 89-74/89. In company with G.Hold, J.Prochazka, and A.Wiedrich, this habitat location was visited once again on February 22nd 1992 and two further plants were then found. The date of 24.11.1992 as the discovery date in the protologue [for G.lukasikii] is also incorrect. Since J.Prochazka evidently had taken no plants with him, even though the documented plants carry his field number, the Type material must be clarified.

The plants collected in 1989 flowered and set fruit in 1991. From the seed, a portion went to J.Prochazka, which he in turn shared with his Czech friends, under his field number. These seeds and the seedlings raised from them are the only basis for the description by Halda. The Type specimen must therefore originate from this material.

There is, however, still one further absurdity - in the first description the flower colour was stated to be pink, and in the accompanying text as "prominently slim sugar-pink flowers". In 2002, in the reproduction of the Latin description, the flower colour was changed to "pinkish-white". Probably in the meantime a flowering plant could have been photographed. In the comparative diagnosis, the new species was compared with *G.bruchii*, but certainly no close relationship was suggested between them.

The spination was described as "irregulariter arachnoideae" (irregularly spiderlike), however, a spider-like spination is not recognisable in the accompanying pictures.

Summing up, this description can in no way be regarded as compliant with current requirements. Really it is unfortunate that the illustrated plants are a good new discovery. However, there are characters included in the description from different spp. which grow sympatrically at the type location.

There are also two further new descriptions which need to be critically investigated - *Gymnocalycium fischeri* Halda, Kupcak, Lukasik & Sladkovsky, and *G. miltii* Halda, Kupcak, Likasik & Sladkovsky. To begin with, one cannot accept the date given for the holotype of *G.miltii*. After careful investigation it would seem that that J.Prochazka was not in Argentina during 1994. Possibly later, when other cactus species from the Acta Musei Richnoviensis are analysed, it is quite possible that one may then be able to recognise at least a markedly reduced number of new plants.

.....from F.Vandenbroeck

Near Villa del Carmen in province San Luis, in an area carrying only sparse and low growing vegetation that did not cover the whole of the ground, we came across a fairly small *Gymnocalycium* with a flat body about 25mm across that only projected a few mm above the surface of the ground. When we unearthed this plant we discovered that it had a very thick taproot so that it looked like the upper part of a carrot, with a very much thinner tap root below.

.....from H.Middleditch

Looking very carefully at this picture of this *Gymnocalycium* unearthed by F.Vandenbroeck, it does appear that the surface of the "very thick taproot" has a number of low hummocks or tubercles. Perhaps this carrot shape really is the body of the plant that shrinks a little way down into the ground in the course of each dry season and - to judge by the dryness of the surroundings - may not re-emerge but merely add on some top growth in the less-dry season? The comparatively thin white root from the bottom of this carrot shape may be the real form of the root. Is this a *Gymnocalycium lukasikii*?

.....from G.Neuhuber

Looking at the picture of the *Gymnocalycium* taken by F.Vandenbroeck near Villa del Carmen, I would call this plant *G.lukasikii*.

.....from H.Middleditch

The location near Villa del Carmen falls within the area occupied by the low-lying ground between the Sierra Cordoba and the Sierra San Luis, and thus lies in a rain shadow, so that humidity may be lower than in either Sierra and daytime temperatures may exceed those on the slopes of either Sierra. These conditions will constitute a more severe environment for this *Gymnocalycium* than for the cacti growing on either Sierra. Under these circumstances this *Gymnocalycium* may well react by developing subterranean growth.

.....from F.Vandenbroeck

The small semi-subterranean *Gymnocalycium* was found near Villa del Carmen in 1991. During my more recent travel I was able to find these plants at several other locations, such as north of Punilla and west of Achiras.

.....from L.Bercht

Between the Sierra Cordoba and the Sierra San Luis there are a number of small sierras which rise above the otherwise more or less level ground. These small sierras may be seen from some distance away and they appear to rise well above their surroundings. But they do not attain any great height being quite low hills with

very gentle slopes so that when walking over one of them it is very difficult to see it as a hill.

During my recent trip to Argentina, I was able to find *Gymnocalycium lukasikii* at several places in province San Luis, including on the Sierra Portezuelo and on the Sierra Euoly to the south of San Jose del Morro. These plants were to be found on rather stony ground, but not where there was a good depth of sandy soil. There were no bushes and little else other than grasses, in their immediate surroundings.

At several of the places where we found this *G.lukasikii* it was growing in company with a sprawling flat padded *Opuntia*. On the Sierra Portezuelo there was *Notocactus submammulosus* and *Gachirasense* growing in the close vicinity of *G.lukasikii*. On the Sierra Euoly and at one or two other places, there were *Gymnocalycium nataliae* growing fairly close to *G.lukasikii* and at one other spot there were also *Lobivia aurea* to be found with them.

I have very carefully taken out of their pots two plants of *G.lukasikii* LB 3153 from the south of the Sierra Portezuelo and one LB 3158 from the Sierra Euoly. Above ground they are flattened, up to 5 or 6cm across but projecting only some 10 or 15mm above the surface. In the ground the first 5 or 6cm is typically part of the body which would shrink into the ground when the plants dry out during the dry periods. Below that carrot like shape, there is a taproot, starting at less than the diameter of the body, roughly 5-6cm long with typical fine branching side roots.

.....from H.Sonnermo

My own *G.lukasikii* grown from JPR100-237 seed is now about 2-3cm wide. But it has a subterranean part of the body which is the shape of a carrot.

.....from R.Zahra

My own *G.lukasikii* grown from seed has been removed from the pot in order to examine the body shape. The body appears to be globular, some 35mm in diameter, but at the base there is a short length of the body, golden brown in colour, very roughly 15mm long and thick, which was below compost level.

.....from G.Slack

I have checked my plant of *G.lukasikii* and I think that it must have been a cutting as it does not show any sign of having part of the body in the compost.

.....from H.Middleditch

Might these observations suggest that *G.lukasikii* reacts to its environment, adopting a typical globular form of growth with little or no subterranean body when it is grown in the less harsh conditions of greenhouse cultivation, but with the major portion of the body underground when growing in fairly severe habitat conditions or in tougher growing conditions in the greenhouse? If any of the other spp. of *Gymnocalycium* which are found in the Sierra Cordoba and Sierra San Luis were to be removed into the habitat of *G.lukasikii* would they also then grow in a similar manner? Do any of the other cacti seen by L.Bercht growing in company with *G.lukasikii* have a portion of their body subterranean in those locations - or do they still retain their normal mode of body growth?.

.....from L.Bercht

My own *G.lukasikii* raised from JPR seed have not yet flowered but I would expect them to bloom when they are about four or five years old, as several of my other seed-raised *Gymnocalyciums* do.

.....from J.Piltz

My own *G.lukasikii* was presented to me by F.Fuschillo as a small seedling of about 10mm across. To the best of my recollection it flowered for me some four or five years later.

.....from H.Middleditch

The picture from J.Piltz of his own *G.lukasikii* is of a plant with a carrot-shape body growing up out of the pot - no doubt well looked after in cultivation so that it does not suffer an extended hot and dry season when it would presumably tend to shrink back into the compost.

It would appear to be quite probable that flowering plants could have been available to Prochazka in 2000, when the *G.lukasikii* was described, from the seed provided by Papsch in 1991. In the first description of *G.lukasikii* there is no reference to the body being semi-subterranean, but perhaps the plants upon which the original description was based had been well watered in cultivation?

## **GYMNOCALYCIUM LUKASIKII J.J.Halda and P.Kupcak. spec.nov.**

**From Acta Musei Richnoviensis 7(2) 2000.**

Species related to *G.bruchii*, but in respect of the flowers larger up to 40mm across, whitish-pink in colour. Solitary, low-growing, flattened, greyish-green, 35-60mm diam., ribs obtuse, more or less crenate, areoles oblong, spines irregularly spider-like; flowers slim, ca. 60mm long, seeds tiny, dark, tuberculate. Taproot thin, ca.40mm long and 5mm across. From Sierra del Morro at 900m altitude. Holotype PR no.JPR 100/237 leg. J.Prochazka 24.11.1998.

From Acta Musei Richnoviensis 9(1) 2002

[Under description of *G.lukasikii*] Somewhat closely reminiscent of *Gymnocalycium gibbosum* in the stem, but with long flowers .... Holotype PR no. JPR 100/237 leg J.Prochazka 24.11.1992.

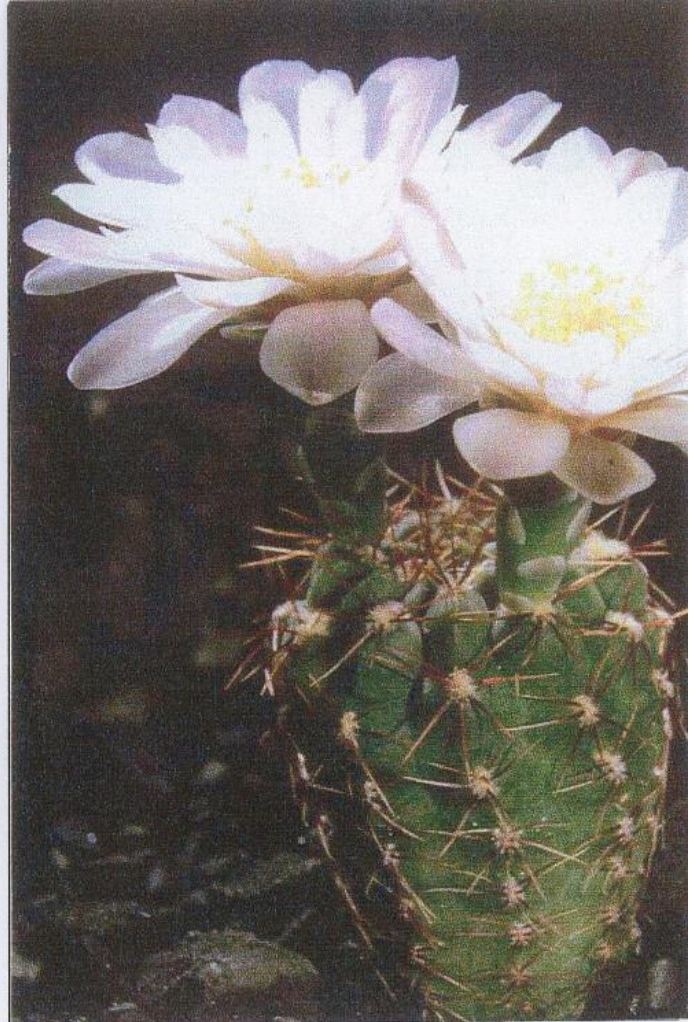
[Under Observations] The floral structure of this small and curious taxon brings somewhat distantly to mind the complex of *G.kieslingii* (Ferrari), from the subgenus *Ovatisemineum*, and on account of the type of flower it differs considerably from those of all of the better-known representatives of that subgenus. The plant was mistakenly allocated to the complex of *G.berchtii* (short, broad flower) - eventually to *G.poeschlii* (dioecious flowering), and finally was transferred in error to *G.papschii* - which in its stem form is most





Villa del Carmen Photo:- F.Vandenbroeck

**Gymnocalycium  
lukasikii**



Collection & Photo:- J. Piltz



Collection and Photo:- R. Zahre



Near San Jose del Morro

Photo:- L.Bercht



closely related to *G.bruchii*, but differs in its floral structure.

.....from H.Middleditch

There appears to be an anomaly in the dates quoted for the deposition of the Holotype, between the Act. Mus. Richnov. publication of *G.lukasikii* in 2000 and in 2002 - a date of 24.11.1998 initially, and then 24.11.1992. There is no record of an independent visit to the Type location being made by J.Prochazka and a habitat specimen being collected. As seed went from W.Papsch to J.Prochazka in 1991 it is difficult to envisage a suitable plant being available as a Holotype by 1992.

.....from G.R.Allcock.

This description and observations for *G.lukasikii* has been translated with the use of my 8-Volume Czech dictionary, but I have to say that at least one sentence appears to me to be ungrammatical. There is also an inconsistent use of italic and roman letters in the latin description. And I cannot at all imagine how a *Gymnocalycium* can simultaneously resemble *G.gibbosum* and *G.bruchii*. I am led to question whether the proofs of this article have been properly read and corrected,

The same J.J.Halda is responsible for a great recent outpouring of names in the genus *Haworthia*, with 54 nomenclatural changes! Also, what is this *Acta Musei Richnoviensis*? At which place of learning is it located? Who are its editorial board? How are its papers refereed? Having done some research into places with the name Richnov in the Czech republic, I have found five such places - three of them small country villages and two small towns. Which of these supports the *Acta Musei Richnoviensis*?

.....from S.Stuchlik

The *Acta Musei Richnoviensis* is published by "Okresni museum Orlickych hor v Rychnově n. Knežnou", edited by J.J.Halda. It is neither a university nor a botanic garden.

.....from G.R.Allcock

Richnov nad Knežnou is a delightful small town of local importance. I know it very well, because it is only 3km away from the place of residence of some of my Czech in-laws. It has a small museum, still in a rather unfinished and somewhat amateurish state, and devoted chiefly to a random assortment of old artifacts from the region, and to a display of old photographs of the locality. I would not think that this museum has the necessary status, as a place of learning, to justify the publication of the *Acta*.

.....from D.Rushforth

During my recent holiday in the Czech Republic, I had once again an opportunity to revisit several collections there, and to chat with their owners. Among those were M.Kirka, J.Prochazka, and E.Lukasik. Whilst there, we also met W.Papsch, who is from Austria. Prior to our departure from England, there was a request from H.Middleditch for any enquiries that could be made of the members of the Czech Cactus Society whom we might visit, regarding the quality and standing of the numerous new descriptions published by J.Halda in the Act. Mus. Richnov. The comments elicited by these enquiries made it very plain that the publications by J.Halda were not held in any great regard by his fellow countrymen whom we met. Indeed, quite the opposite, and Halda's work was considered as being of no real academic worth.

We did see some plants of *Gymnocalycium lukasikii* in almost every collection that we visited, but they appeared to have all been raised from the seed which came from W.Papsch, which he obtained from his collected plants. None of these plants were really quite as spiny as that in the photograph in the Act. Mus. Rich. publication, which presumably was taken in habitat.

.....from W.Papsch

There was no independent visit to the habitat location of *G.lukasikii* made by J.Prochazka, or any of his fellow cactophiles, after he accompanied me on the field trip in 1992. Consequently there was no Holotype conveyed to J.Halda. The first description of *G.lukasikii* by J.Halda is simply a result of his vivid imagination, as Halda did not even possess a specimen of this plant.

.....from H.Middleditch

If indeed there was neither a Type nor a Holotype of *G.lukasikii* available to J.Halda, and no ex-habitat "PR no.JPR 100/237" in existence, is this species name really invalid? However, if Prochazka did indeed make a return trip to the Type location and collect a specimen, without letting Papsch know about it, then the name could be valid. Or could the JPR 100 237 simply be an accession number? The two pictures of *G.lukasikii* which appeared in company with the Czech publication of this species, appear to have been taken in habitat. Might these have been the real basis for the original publication of this name? Until we can clarify the real origin of the JPR 100/237 plant, there appears to remain the alternative of *G.lukasikii* n.n. or *G.lukasikii* sp. nov.

.....from G.J.Swales

It is rather amusing to see that Halda has actually named one of his supposedly new sorts of *Gymnocalycium* after his dog.

#### **COMMENTARY ON SOME NEW DESCRIPTIONS BY J.J.HALDA. By W.Gertel and R.Wahl. Translated by H.Middleditch from K.u.a.S. 55.1.2004**

For some years now the Czech author J.J.Halda has startled the cactus world with a veritable flood of new descriptions and recombinations, which generally appear in the Journal "*Acta Musei Richnoviensis*" published by himself. In addition to a multitude of new Taxa from Mexico, there are also several plants from South America described by him (and co-authors). Among these are also to be found Bolivian Taxa, some of which we must discuss here. (Discussion of *Sulcorebutia hertusi*, *S.veronika*, and *Rebutia odehnali*).

### **Weingartia jarmilae.**

A capital error has occurred by Halda & Horacek (in Halda et al 2000:40) with the description of *Weingartia jarmilae* Halda & Horacek, since clearly a *Lobivia oligotricha* Cardenas has been described here. Also when Halda et al. once again assert "a typical *Weingartia* - one of the most ornamental *Weingartias*", this declaration is incorrect. By making reference to a picture in the first description of *Lobivia oligotricha* Cardenas (1963), or the book of Rausch (1987), this error would have been avoidable. In the former one reads that the flower tube of *Lobivia oligotricha* is decked with a few white hairs and Rausch (1987) writes "The scales on the pericarpel and on the tube have only quite sparse woolly hairs or quite naked". From some observations at the Type locality we can say that it really does display flowers without any sign of hairs on the tube. The proof for the described plant in question really being the aforementioned *Lobivia*, is provided by Halda et al. themselves with their illustration 61 and 61A. There one sees on the flower tube of *Weingartia jarmilae* slender pointed triangular scales and on close inspection even some fine hairs, both characteristics which are absolutely not present with *Weingartia*. Consequently *Weingartia jarmilae* is to be put into synonymy with *Lobivia acanthoplegma* v. *oligotricha* (Cardenas) Rausch.

.....from D.Hunt

I do not think that Papsch puts forward any cogent reason why names like *Gymnocalycium lukasikii* could be deemed invalid under the provisions of the ICBN. These have no bearing on whether the taxon is or is not well-characterised. The name is only the label on the box, not its essential contents, i.e. the nomenclatural type.

If Papsch can recognise (i.e. identify) the plant from authentic live material, photographs, etc., as he implies, then there is nothing to stop him providing a thorough and competent description, including those features which he considers separate the "different species which grow sympatrically at the habitat location". But he will probably have to put up with the name proposed by Halda & Kupcak.

.....from H.Middleditch

In view of the rather unusual mode of growth of *G.lukasikii* in habitat, it would be very handy to have a name for it. According to the above observations from D.Hunt, we are quite entitled to use the name *lukasikii*. Also, in view of the comments from J.Piltz and L.Bercht that these plants can be expected to flower from seed in four or five years, then the seed sent to Prochazka in 1992 may well have germinated and the seedlings produced flowers by 2000, when *G.lukasikii* was first described.

.....from G.Hole

During the course of a trip to the continent, visits were made to various collectors. When viewing the collection of W.Papsch, I was shown a clumping plant with five heads and was told that it was *G.lukasikii*. None of my own *G.lukasikii* are large enough yet to start offsetting.

.....from L.Bercht.

All the *G.lukasikii* which I came across in habitat were solitary, I never came across any which were carrying offsets.

.....from F.Vandenbroeck

I have not seen any of these small flattish plants in the area between the Sierra an Luis and Sierra Cordoba which were clumping.

.....from H.Middleditch

There would appear to be no indication in the Czech descriptions of *G.lukasikii* to suggest that this species does or does not produce offsets. Do we have yet another anomaly here?

.....from G.J.Swales

In the Austrian "*Gymnocalycium*" 20 (1) 2007 there is a map of the distribution area in which *G.lukasikii* - which they call *G.tanangaense* v. *lukasikii* - is to be found.

.....from G.Hole

I have grown on the two or three plants each from Piltz and Papsch which were raised from "JPR 100" seed and they are now in two and a half inch pots. The body of these plants is carrot shaped with much of it buried in the compost. But the *lukasikii* which I obtained from Papsch does not have any subterranean body and I am puzzled by this. Now, I do not think that they are the same sort of *Gymnocalycium*.

.....from H.Middleditch

The map which is included in the 20 (1) 2007 Austrian "*Gymnocalycium*" marks the eastern third of the Sierra San Luis as the distribution area for *G.lukasikii*. Presumably this refers to the clumping form of these plants which were collected and are being grown by Papsch. This indicated distribution area excludes the low lying area between the Sierra San Luis and the Sierra Cordoba and so excludes the finding places of Villa del Carmen, Sierra Portezuelo, and so on, where L.Bercht and F.Vandenbroeck have found the low-growing semi-subterranean *Gymnocalycium*. The text accompanying this map appears to make no reference to these plants having a semi-subterranean body. All these factors taken together would suggest that there are two quite different sorts of *Gymnocalycium* involved under the *lukasikii* name. It would also appear to be probable that the "JPR 100" Holotype for the Czech description of this species may well not have been raised from the seed supplied by Papsch. Plants or seed of this form could have been collected quite independently by Prochazka, who appears to be unwilling to clarify this situation.



## A VISIT TO THE CERRO CALLE CALLE From P.Bello

My journey to Bolivia was very informative even though I was not able to visit as many places as I planned, nor to see as many different cacti as I had wished. This was because I did not rent a vehicle. I went to Sucre as I had planned, and made trips from there to several places, including one as far as Zudañez.

The approach to Zudañez is along the narrow valley of the R.Zudañez. At Zudañez there is an even narrower gap in the mountain ridge which forms the eastern side of this valley. Through this gap passes the main road which continues to the east, towards Tomina. Just on the eastern side of this gap, standing on the road and facing north, there is a fine view of the Cerro Calle Calle. Straight ahead are the extremely steep, bare, rocky sides rising from some 2500m at the base up to as far as 3224m at the top. These bare cliffs continue uninterrupted for some 2 or 3kms. along the north side of the road. From this viewpoint I walked perhaps another three km along the road, which followed the foot of the easier slopes at the base of the Cerro Calle Calle. From there I walked about half way up this easier slope and then turned to walk back along the slope, in the direction of Zudañez. But this proved rather difficult, because of the many bushes, the rocks, and the roughness of the ground. It was quite easy to see the *Trichocereus* (which may be *T.macrogonus*), the *Roseocereus*, and the *Cleistocactus* standing up above the bushes. The *Echinopsis* were very variable; there were plants with green epidermis and plants with a reddish epidermis; with thin spines or with stronger spines; the older plants more or less columnar.

The walking was so difficult that I turned away from the Cerro itself and followed the less difficult ground right at the foot of the slope, close to the road. Here I met up with one of the local indians who indicated a steep path by which I could reach the top of the Cerro Calle Calle, starting from near the spot where I had come through the gap in the mountain ridge near Zudañez. Between this mountain ridge and the Cerro Calle Calle, there was a valley whose floor rose steadily at a fair gradient. The track ascended this valley and then turned to the right to zig-zag its way up the steep side of the Cerro Calle Calle. On the way up there were patches of bromeliads growing on isolated little rocks, and also occasional plants of *Lobivia cinnabarina*. Before reaching the Estancia Calle Calle, I passed a plant which I could not recognise, growing in a cleft in the rock. It had eight or nine stems, branching from the base, which leant away from each other to some extent, the tallest being about 50cm high, all about 6cm in diameter, with 18-20 ribs, and very few short red-brown spines. Being August, there were neither flowers nor fruit.

Beyond the Estancia I turned to climb towards the highest part of the Cerro, which was about 2km away. Once at the top of the Cerro I found that the crown consisted of an extensive flattish area which lay on a moderate slope, rising from about 2900m at the western end to about 3200m at its eastern end, where it fell away precipitously to the valley below. Scattered over this crown were various rocks, some really very large indeed, which stood up among the corn and potato fields. Here and there we found an *Austrocylindropuntia*, perhaps *A.verschaffeltii*. The *Echinopsis* and the *Cleistocactus* growing here were similar to those which I had seen on the lower slopes. On one or two of these rocks I found *Rebutia fiebrigii*. There were about a dozen plants ranging from 1 to 5cm in diameter. They grew on the SW side of the rocks in cracks on the steep face where they would be in shadow from the sun for most of the day. There were many mosses and lichens on these rocks and on the *Rebutia*, some of the *Rebutia* being entirely covered by moss and lichen. The soil in the crevice in which their roots were embedded seemed to be quite rich in humus and was very wet although it had not rained for a considerable time. These plants had young red-brown spines contrasting with the old, grey ones. We also saw a lower-growing *Trichocereus* species to which it has not been possible to give a name.

I took a somewhat circular route round the top of the Cerro, back to the Estancia, down the zig-zag path, and then directly along the road back to Zudañez. (Shown as a broken line on the accompanying drawing of the Cerro Calle Calle).

.....from H.Middleditch

The identity of the columnar plant "Borzicactus?" seen on the ascent of the zig-zag path is far from self-evident. The photograph received from P.Bello (slightly out of focus and not reproducible) shows what might possibly be a *Cleistocactus*. This plant looks rather stout for its height, comparable to the plants I have labelled *Cleistocactus micropetalus*, which are to be found at no great distance to the east of this spot. It certainly has a paucity of spines - not only less of them but also shorter than one might associate with *Cleistocactus* from this part of Bolivia. It is growing independently of any bushes which elsewhere seem to act as support for many of the more slender stemmed *Cleistocacti*.

.....from J.R.Kirtley

The plant on the Italian photograph is not one that I can recollect seeing in Bolivia, but it may possibly be a *Cleistocactus*. We did not get as far as Zudañez on the trip to Bolivia in company with B.Bates, but we did see quite a lot of *Cleistocacti* more to the west. Those we did see which I can check on my slides, look as though they had more spines and longer spines, than the plant at Zudañez.

.....from R.K.Hughes

We saw nothing quite like the plant on your Italian picture whilst we were in Bolivia. Most of the *Cleistocacti* we saw had a good cover of spines, either longer or denser (or both) compared with the spines on the plant in the picture.

.....from U.Eggli

The general habit of this plant is indeed reminiscent of *Cleistocactus*, but without a better knowledge of the cactus flora of Bolivia, I would hesitate to definitely exclude *Trichocereus* from consideration.

.....from R.Hillmann

The picture from your Italian member may be of a *Trichocereus* which looks very similar to those which I



saw myself on the Cerro Calle-Calle. At the top of this Cerro it is very arid, most of the ground being covered with patches of solid pale-grey rock, boulders, or sandy-brown grit. Possibly the largest plant of the lower-growing *Trichocereus* which we saw there must have had about thirty stems, all branching from the base like the plant in the Italian picture, with the lowermost part of the stems leaning outwards and the upper part of the stems growing upright. The older part of the stems were drab and somewhat corky, but the newer growth was quite bright green, in stark comparison with the few leafless bushes and few clumps of dried up grass to be seen in the immediate surroundings. The spines on the new growth are chestnut brown and might possibly be described as slightly reddish-brown, which again is similar to the spination on the Italian plant. It may have had about 14 ribs and a very blunt growing point, again rather similar to the Italian plant. There were no flowers to be seen on these plants at the time of my visit, but there were one or two small hairy buds to be seen clustered together at the growing point, just as would be expected in *Trichocereus*.

.....from H.Middleditch

The identity of the particular plant seen by P.Bello may still be in question. However, there would appear to be little on record about the form of *Trichocereus* seen by Hillmann being found on the Cerro Calle Calle or even in the general area. Sucre-Zudañez.

.....from T.Marshall

On our 1998 trip to Bolivia we did get a chance to ascend the Cerro Calle Calle, near Zudañez. During the first three weeks of travelling, in company with B.Bates and J.Carr, we made a one-night stop in Zudañez in order to make an exploratory ascent of the Cerro Calle Calle. After returning to La Paz, a further three weeks was spent travelling with J.de Vries when another stop was made at Zudañez. This time for four nights, which allowed four separate day trips to be made to Cerro Ayrampo, Cerro Calle Calle, Cerro Mandinga, and Mojocoya.

The town of Zudañez lies at about 2450m altitude in the narrow valley of the R.Zudañez which runs roughly in a NNW-SSE direction here. Immediately on the east side of this valley and parallel to it there rises the mountain ridge of the Cerro Ayrampo, rising up to some 2850m altitude. Due east of Zudañez there is a gap in this ridge which is utilised by the road going eastwards from Zudañez (in the direction of Tomina and Padilla), the ground rising equally abruptly on both sides of this gap. The ridge of the Cerro Ayrampo is steep sided, but not so steep as to prevent us tackling the ascent on foot. Albeit that the steepness of the slope obliged us to zig-zag up much of the climb. The sparseness of the low bushes and shrubs offered no real obstacle to this ascent. Right at the very foot of the climb, there were some *Trichocereus macrogonus* to be seen, but there were none of these *Trichocereus* to be seen either on the steep sides nor on the top of the Cerro Ayrampo. At the upper part of this ascent, as well as along the top, there was an occasional *Lobivia cinnabarina* to be seen, possibly the odd one or two in bud. The crown of the ridge consisted of a series of hillocks and once we had reached the top we walked along the crown of the ridge for about 2 km., up and down these hillocks. We did see an occasional dwarf tree but in general the vegetation was very sparse. In addition to the *Lobivia cinnabarina*, the only other cacti we found were *Sulcorebutias*, which grew in abundance over large patches of the hilltops, in flat, shaly, ground. These were probably *S.rauschii*. On all these plants we only found one single flower, of a blood red colour. The sides of the hillocks were mostly solid rock and offered little opportunity for colonisation by either cacti or other vegetation.

On the next day we set off to explore the Cerro Calle Calle, which lies immediately to the east of the Cerro Ayrampo, on the north side of the road going eastwards from Zudañez towards Tomina. The lowermost slopes of the Cerro Calle Calle display a less abrupt gradient and carry rather more vegetation, in the shape of shrubs, bushes, and low trees - such as *Acacias* - with quite a few stands of *Trichocereus macrogonus*. The tall *Roseocereus* were also fairly numerous here. These tall cacti made themselves obvious by standing up above the surrounding vegetation, but any smaller cacti here would be hidden in the general vegetation and we did not explore these lower slopes of the Cerro Calle Calle, which came right down to the road. The cliffs which are very prominent in the sketch from P.Bello represent the southern end of a massive table-top mountain ridge which runs away to the north, parallel to the Cerro Ayrampo. The sides of this northward extension of the Cerro Calle Calle are also formed of cliffs, falling to the east and to the west, mostly nearly as steep as those in the sketch by P.Bello.

From our position on the road we could see that between the Cerro Ayrampo and the Cerro Calle Calle there was a valley rising at a relatively modest gradient, up which we drove for about a couple of Km. Then, via innumerable zig-zags, we drove up the steep side of the headland and shortly after reaching the top we came to the Estancia Calle Calle. We then drove north for perhaps 8 km, the ground rising and falling without steep gradients. We stopped at several spots along this track, but - search as we might - we were not able to find any *Sulcorebutia*, even though we were at an altitude of some 2850-3000m. We did see some occasional plants of a *Cleistocactus*, sometimes a few growing together. They were not more than 2 to 3 feet tall, rather straggly looking and we took them to be *Cleistocactus aiquilensis*. None of the plants we saw were in bud or flower. In addition we came across the occasional plant of *Opuntia vestita*. We had seen neither of these plants along the top of the Cerro Ayrampo.

So we retraced our tracks to the Estancia Calle Calle and then drove a short way along a gentle ascent, in a south-easterly direction, from where we walked back and forth over the table-top headland of the Cerro Calle Calle. From the Estancia the headland rises fairly steadily up to a maximum of about 3224m altitude before terminating in the steep cliffs seen in the sketch from P.Bello. On top of this massive sandstone structure there are dotted numerous erratics, and also isolated pinnacles of rock seemingly inaccessible due to having very steep sides like the main slopes around the mountain. On the headland there were occasional shrubs and a fair amount of grass tufts but much of the headland was solid or broken rock. There were some small fields used for agriculture, but these were mostly near the cliff edges where there seemed to be more soil. There may be

more moisture close to the cliff edges brought about by convection currents as there was a lot of mist at the cliff top, early in the morning.

Getting close to the edges of the headland where it drops steeply to the valley below, we came across *Aylosteria fiebrigii* with orange-red flowers. This area is probably the collecting place for Lau 393. There seemed to be more moisture at these edges of the headland than over the crown as a whole, possibly because there is a lot of mist early in the morning which hangs around the edges of the headland. Away from the edge of the headland, we found *Sulcorebutia* growing in considerable numbers at numerous places over much of the headland, starting near the Estancia Calle Calle. We found this with yellow flowers, with red flowers, with orange flowers, and with bicoloured (or flame coloured) flowers. The plants with yellow flowers were generally growing on their own without any companion plants in another flower colour, but the various reds and flame coloured flowers seemed to grow together, more or less without any yellows. We identified these as *S.rauschii* v. *callecalleensis*. We had the impression that this headland was just a little moister than the area of the Cerro Calle Calle to the north of the Estancia Calle Calle, over which we had travelled earlier that day and where we failed to find any *Sulcorebutia*.

Also growing on this headland, over the same area as the *Sulcorebutia*, were occasional *Echinopsis*, with rare exceptions solitary, of globular form up to about 10cm in diameter, with an occasional plant possibly some 15cm or more in diameter. Also to be seen here and there were small plants of *Austrocylindropuntia vestita*, as well as the occasional *Lobivia cinnabarina*. We did not see any *Cleistocactus* on the headland, even though they had been seen there by P.Bello, so we assume they are fairly sparse there. In addition, far more obvious were the waist-high *Trichocereus* looking very much like those photographed there by R.Hillmann, but no name has so far been suggested for it. These *Trichocereus* were dotted about quite sparsely over the top of the headland and occasionally even near the edges of the headland. None of these plants were in flower but we did see one or two just starting to bud up at the very top of the stem, close to the growing point, in a crown formation.

The largest plants of this *Trichocereus* were about 1.5m tall, branching profusely from the base with stems leaning outwards with the upper portion of the stems growing upright, reaching two feet or more across the larger clumps. From the rather woolly heads and the remnants of old flowers they would appear to flower from an early age, as the smallest plant with these features was only about one foot high. There is a possibility from memory that we saw more of these same *Trichocereus* as we were driving along the valley of the Rio Zudañez, approaching the town of Zudañez.

On the following day we set off southwards out of Zudañez along the valley which is a continuation of the R.Zudañez valley, but here the river has another name. We were heading towards Hacienda Mandinga, some 20km away. Our first stop was just outside Zudañez, where we climbed up a fairly steep sided hill and on top, at about 2600m, we found forms of *Sulcorebutia* with long white spines which we regarded as intermediate between *S.tarabucoensis* and *S.crispata*. We then made four or five stops at intervals along this route, on each occasion scrambling up the steep sides to the top of a hill to see what we could find. And on each hill top we found *Sulcorebutia* of the *tarabucoensis-crispata* form. We also found some *Aylosteria* (which may be either *fiebrigii* or *brunnescens*) growing in quite damp conditions at odd spots on the ascent of these hills. These *Sulcorebutia* and the *Aylosteria* were growing fairly close to each other. At a stop made when we were getting near to the Hacienda Mandinga, where we close to the banks of the river, both the *Rebutia* and the *Sulcorebutia* were to be seen in larger sizes than the plants at our previous stops along this route. That is, they were roughly up to 2 inches across whereas at the other sites they were up to one inch across.

On the final day of our stay in Zudañez we drove a considerable distance north from Zudañez in order to reach Mojocoya, where we were within some 17 km of the Rio Grande. Down in the valley, as we were approaching Mojocoya, we were below 2000m altitude and here we came across *Gymnocalycium pflanzii* affinity; we saw none of these plants either in bud or in flower. In this valley as in the other valleys around Zudañez, the ubiquitous *Opuntia sulphurea* was to be found almost anywhere. Up on the plateau, at roughly 2700-2800m altitude, we again found some *Sulcorebutia* which looks very much akin to *S.mizquensis* or *S.crispata*, smallish white spined bodies with delightful pink flowers. These were recorded by J.de Vries under the name of *Sulcorebutia mojocoyensis* n.n. There were none of the waist-high *Trichocereus* to be seen here.

.....from F.Vandenbroeck

The low-growing *Trichocereus* on the picture taken by R.Hillmann on the Cerro Calle Calle, I have seen at two locations; one to the west of Zudañez and the other to the south-east of Padilla. The plant near Padilla was budding up and grew in company with *Rebutia* and *Pfeiffera*.

.....from J.Carr

It was nearing the end of September 1998 when we visited the Cerro Calle Calle. We did not attempt to reach the top of the headland, but only went part-way up and searched around an area in the vicinity of the Estancia Calle Calle. This spot had been visited by J.d.Vries during the same week of the previous year, when the *Sulcorebutia* were reported to found there "in their thousands". But it was still fairly dry when we were there, and we had great difficulty in finding even half a dozen specimens as they were all shrunken down below the surface of the ground. So we abandoned the search and moved on. But whilst we were making this search we did see some specimens of the short-stemmed *Trichocereus*, although they were certainly not abundant.

.....from J.de Vries

This plant of *Cerei* form growing on the top of the Cerro Calle Calle could easily be a *Helianthocereus*. These plants, with white flowers, go all the way from Zudañez to Monte Puncu, but always there are only a few plants growing together at one place. Sometimes it is even a single isolated plant.

.....from H.Middleditch

The drawing of the Cerro Calle Calle (reproduced here) which was received from P.Bello includes a tiny sketch of *Trichocereus* seen on the lower slopes between the road and the very steep side of this Cerro. This is not depicted as a basally branching plant, but as a single main stem with a few branches at intervals up the main stem, and identified as *Trichocereus macragonus*. This form of growth is basically reminiscent of *T.pasacana* or *T.atacamensis*.

.....from T.Marshall

Driving east from Zudañez, the road ran along the foot of the Cerro Calle Calle, where we could see some fairly tall *Trichocereus* growing quite close to the road, on the lower slopes of the Cerro. Unlike the fairly widespread *Trichocereus* to be seen in the area around Zudañez, which branched fairly prolifically from the base, with more or less upright stems of up to about 1.5m. tall, these other *Trichocereus* were somewhat thicker stemmed with one main stem and a few branches from places along that main stem. We saw these same sort of *Trichocereus* again when driving south from Zudañez, and also from the road leading out of Zudañez to Tarabuco.

This tall *Trichocereus* was not especially numerous and it was only to be seen here and there, not everywhere along the roadside. They grew on the lower slopes of the mountains so that when we started to walk up a mountainside, it was usually not long before we left these tall *Trichocereus* behind on the lower slopes.

Going further towards Tarabuco, the valley gradually widened out so that the tall *Trichocereus* appeared alongside the road, but absent from the ploughed fields behind, although they were occasionally to be seen further away, on the lower slopes of the mountains bordering the valley floor. Roughly half way from Zudañez to Tarabuco the road was running over a broad flat plateau which was virtually given over completely to farming and so there was an almost complete absence of natural vegetation.

From Sucre we drove northwards towards Aiquile. Between Aiquile and Mizque the road followed a valley which was very warm and green, almost tropical. There were the usual basal branching clumps of *Trichocereus* to be seen here but now we also sighted the occasional *Roseocereus tephraanthus*, and once again the tall, columnar *Trichocereus*. Now these *Trichocereus* were, if anything, taller and perhaps a little stouter than those that we had seen in the general area around Zudañez. Again, whenever we stopped in order to climb up an adjacent mountainside, we were not able to see any more of these plants once we had left the lowest slopes.

At various places we saw buds on these tall *Trichocereus* which were always from close to - or on - the crown of the stem, but we did not see any open flowers.

.....from J.Carr

After driving for some 10 or 15km to the south out of Sucre, we started to see some *Trichocereus* growing on the hillsides and even fairly close to the road. These plants were about 2 to 3m tall and the stems were probably about 5 to 6 inches thick, with branches from above the base. As we approached Yamparaz, the ground levelled out and we no longer saw these *Trichocereus* from the road, much of the surroundings now being given over to farming. Going towards Tarabuco it was a wide plain and only between Tarabuco and Zudañez where the hillsides came closer to the road, did we see these columnar *Trichocereus* again.

There was a different sort of *Trichocereus* to be seen on the Cerro Calle Calle which branched from the base and grew to about 1.5 to possibly 2m tall. with thinner stems of about 2 to 3 inches in thickness and without the bluish green sheen to the body which was displayed by the tall *Trichocereus*.

Between Sucre and Yamparaz, we turned off the main road at various places in order to go down a side road, looking for a place where we could walk up the hillsides and search for *Sulcorebutia*. Down each of these side roads we came across the tall columnar *Trichocereus* growing on the lower parts of the hillsides. Down one turn, as we were going eastwards, we drove for about 5 miles gradually losing height and came across a stand of hundreds of these tall *Trichocereus*. The local inhabitants must have hacked off their branches so frequently that virtually every one of these plants was producing only monstrose now growth. The offcuts were evidently used for hedging to judge by the considerable lengths of hedging formed by plantings of these *Trichocereus*.

Around the Cerro Calle Calle we did see some of the basally branching thinner stemmed *Trichocereus* which certainly grew up to 2 or 3m - or more - in height. The difference in the apparent mature height between these *Trichocereus* near the base and those seen on and around the crown, of the Cerro Calle Calle, may possibly be a result of the difference in the altitude at which they were growing, together with the difference in the degree of exposure between the two locations.

.....from H.Middleditch

The *Trichocereus macragonus* was first described by Salm-Dyck in 1849 as "*Cereus macragonus* H.Berol" where it was stated to have a stem of "*hucusque 8-10 pollicaris, diametro fere bipollicari*". My Latin dictionary suggests to me that this would be "8-10 inches tall at present and almost two inches in diameter". Hardly a mature *Trichocereus*. And what is the significance of the "H.Berol"?

.....from G.J.Swales

The "H.Berol" is probably a reference to the Berlin Botanic Gardens, where this plant may well have been in cultivation at the time it was described by Salm-Dyck.

.....from H.Middleditch

So do we know if any of the early European travellers to Bolivia passed through any part of this area between Sucre and Zudañez where they could have collected this plant - and who were they? Or alternatively, perhaps one of them brought back home some seed, which would have been a great deal more practical than trying to convey a cutting off a mature *Trichocereus* back to Europe.





**Trichocereus sp.**  
Crown of Cerro Calle Calle  
Photos: -R. Hillmann



**Trichocereus 'macrogonus'**  
Foot of Cerro Calle Calle  
Photo:- P.Bello

We do know that Alcide D'Orbigny travelled from La Paz to Cochabamba and on to Santa Cruz de la Sierra on 1830 - as detailed in Chapter 25 of his "Voyage dans L'Amérique Meridionale" - a route which would not pass through the area where sightings of *Trichocereus macrogonus* have been reported.

From the "Botanical Activities of Thomas Bridges" in Cont. Gray Herb. Harvard 81, 1928, there is recorded his journey in 1844 from Cobija on the Pacific coast (then in Bolivia, later incorporated in Chile), via Calama to Potosi and then "on to Chuquisaca, about 60km west of Sucre" where he stayed for a month and then went on to Cochabamba. A location some 60km to the west of Sucre lies in an area which would lie well outside the then currently accepted trade routes which were normally followed by European travellers at that time. On the other hand, Sucre, in the province of Chuquisaca, lay on a long established trade route used for centuries for exporting silver from the Andean mines to Buenos Aires for onward shipment to Europe.

Evidently J.B.Pentland did a considerable amount of exploring off the beaten track in S.Peru and in Bolivia, as outlined in Dict. Nat. Biog. xlv, 1895. Pentland was Secretary to the Consul-General in Peru in 1827 and then Consul-General in the Republic of Bolivia from 1836 to 1839. For this latter posting, he would presumably be resident in Sucre, the capital of Bolivia at that time. Here, he may have been handily placed to see *Trichocereus macrogonus* in Habitat by travelling no great distance out from Sucre.

.....from G.J.Swales

My "Latin American Handbook" states that, following independence from the Spaniards, the capital of Bolivia was established at what was then Chuquisaca, under the leadership of General Sucre. When he stepped down in 1831, his successor renamed the capital city as "Sucre" in his honour. It was so named at the time of Pentland's posting here and at the time of Bridge's visit in 1844.

.....from H.Middleditch

It would appear that the writer of the 1928 Harvard publication of Bridge's travels lacked this piece of information, as he seems to have misplaced the location of "Chuquisaca". It is unlikely that Bridges would travel from Potosi to Cochabamba without making a stop at the then capital of Bolivia to contact the British Consul there.

And if Bridges had collected some *Trichocereus macrogonus* seed near Sucre in 1844, some of which might arrive at the Berlin Botanic Gardens in 1845, could it have yielded a plant of "8 to 10 inches in height" by the time of Salm-Dyck's 1849 description? Which would explain the size of the plant especially if it had been grown from seed. For practical purposes, the Salm-Dyck 1849 description is repeated by Förster-Rumpler in 1886. But in Schumann's *Gesamtbeschreibung der Kakteen* of 1903, it is described as "of tree-like growth branching sparsely, up to 6m tall, reaching up to 2m in cultivation". which may well have represented the growth in the intervening years in the Berlin Botanic Gardens of the plant described originally by Salm-Dyck.

.....from G.D.Rowley

Looking through my early references, I see that there is an entry for *Cereus macrogonus* H.Berol in "Cactaeae in Horto Dyckensi cultae" which was published in 1841.

.....from H.Middleditch

Which means that the *Cereus mandragorus* was already in cultivation in Salm-Dyck's collection in 1841 so that this name is of earlier date than Bridge's visit to Bolivia.

.....from B.E.Leuenberger

Here at the Berlin Botanic Garden there is no old herbarium material - if there ever was one, it was destroyed in 1943. If there ever was such data, I suppose that Schumann would have mentioned it in 1897 (page 115). Schumann applied the name *Cereus macrogonus* to a species from Brazil. and had illustrated it earlier in *Flora Brasiliensis* (1890) - which was clearly a *Pilosocereus*. Under "Anmerkung" (on page 115), Schumann comments on doubts regarding the correct interpretation of the name.

The plants currently in cultivation under this name is evidently a *Trichocereus*. It is not clear if this is the same name as the plant already mentioned before 1900 by Haage as good grafting stock. Spine counts of the plants known today do not seem to agree with the protologue. It will be difficult to prove beyond doubt if the Haage plant was - or was not - the same as that of Salm-Dyck. I am not aware of any old illustrations and neither of old herbarium material.

Of little help is the information that the spirit collection here at the Berlin Botanic Garden contains a sample of Weberbauer 1580 from Peru, originally labelled as *Cereus bridgesii*, undated, but according to the number it was collected in 1902. It is annotated in pencil on the jar as *Cereus macrogonus* S.D. (unfortunately without indication by whom). The specimen looks rather similar to *T.peruvianus* or *T.chalaensis* and has presumably nothing to do with the name *Cereus macrogonus*.

.....from H.Middleditch

The original description for *Cereus macrogonus* includes "ribs 6-7", which would appear to allow it to be accommodated within *Trichocereus peruvianus*.

.....from R.K.Hughes

Whilst most of the *Trichocereus* which were to be seen in Peru displayed about 8 or 9 ribs, we did see some plants near Tinajas with 6 or 7 ribs.

.....from H.Middleditch

As *Trichocereus* with a rib count of 6 to 7 do not appear to be reported from the area between Sucre and Zudañez, but do exist in Peru, it would appear that *Cereus macrogonus* S.D. very probably originated from southern Peru - perhaps brought back by Pentland? And described as *Cereus peruvianus* by Haworth? Whoever wrote the pencil note on the specimen jar containing the "*Cereus macrogonus*" in the Berlin Botanic Garden would appear to have come to the very same conclusion. So what name do we use for the *Trichocereus* with the solitary stem and few branches which has been seen in the Sucre-Zudañez area?



**FORTY YEARS' ADVENTURING** By F Ritter  
Translated by H.Middleditch

At the end of April 1958 I made an expedition to La Torre, going there by lorry. From there I went to Villa Abecia and took a lorry from there to Ingahuasi. Close to Ingahuasi there are practically no cacti but in a steep gully I did find something new. Further exploration was prevented by the threatening attitude of the natives, so I had to make my way down to Culpina in the dark. In the few days that remained before I would have to return to La Paz to renew my visa, I wanted to explore the area between Culpina and the Pilaya river. On that route lies the hamlet of Salitre. On the next morning I set out for that place, but was twice given incorrect information about the way there, so I went in the wrong direction. After some hours I came to the south end of the Culpina basin, where there is no outflow, and here I found some interesting new cacti. From here I had to turn back and make a huge detour to reach the right road, which took two hours. To reach Salitre I was told to follow the vehicle track. As it later transpired, there was an alternative and very much shorter path to Salitre, used by all on foot. This footpath finally brought me to Salitre, From there a steep climb went towards the watershed between the basin and the Pilaya affluents. Before sunset I came to Cueva, where I remained overnight.

From Cueva, the footpath went steadily down a valley, until it became so rugged that the footpath twisted and turned, then an endless descent went down to the Challamarca river, which discharged into the R.Pilaya. On the way I found various new cacti. The descent eventually became very hot and by late afternoon I arrived at the bottom of the Challamarca valley where I discovered another new *Parodia*, which carried flowers and seed. I stayed there briefly, to collect seeds of the new *Parodia*. I could not take photographs so instead I took with me two fine specimens with flower buds which would open in the following two days so that a photograph and description of the flowers could be finished elsewhere, just as I had already done with success with those from the Cajas valley.

Now I had to climb back up out of the Challamarca valley for about 1000m in order to reach the first water; this was reached at about 10.30 p.m. by which time the battery in my torch had given out. On that very morning I had seen a house near this spot, but I was not able to find it in the dark, so finally I had to lie down in the open in my sleeping bag and passed a good night. The next day I passed Cueva and went on to Salitre. On the highest pass I collected more seeds of *Parodia*. About sunset I arrived at Salitre where I stayed overnight. On the following day I walked to Culpina and then took a lorry back to Camargo.

Next day I started out again walking along the road to Culpina from Camargo. At the foot of the climb I got a lift on a lorry in order to reach the area of the pass. Finally I came to the place where I wanted to be, where a *Parodia* grew, from which I wanted to collect seed. Scarcely had I collected specimens and seeds than I was again harassed by a number of local indians. Finally the estate lorry from Salitre came by, which took me back to Camargo.

On 19 February 1963 I left Puente San Pedro to go via Culpina to Salitre. Beyond Culpina I became stuck when crossing a stream; only after several hours' work did I succeed in getting across, reaching Salitre by dusk. On the next day it was already pouring with rain at daybreak. After some clear sky, more rain fell violently, then repeatedly with brief intervals. Eventually I did walk as far as Cueva, without attaining anything useful; on the walk back on the following day, the sun shone. Now I wanted to go to Potosi and from there to return to Chile.

On 10 March 1967 I made an expedition from Villa Abecia towards the east and paid a further visit to Culpina, where a well-run Hacienda grew wheat on a fertile depression.

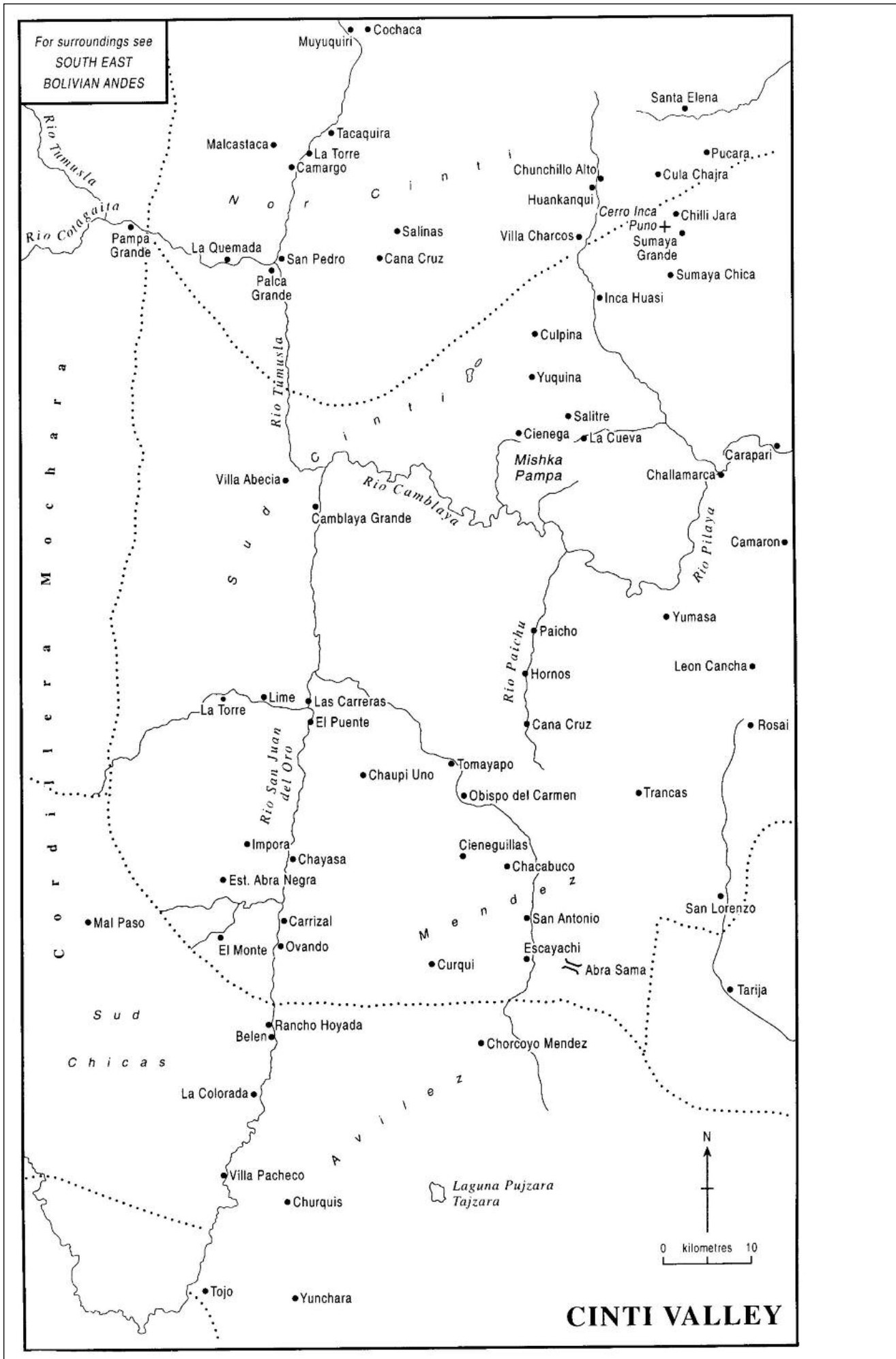
.....from W.Weskamp, *Parodia* - 2

Ritter told me "I found my *Parodia subtilihamata* FR 741, whilst descending a path along the edge of a mountain from Cueva to the Rio Challamarca, growing on a small, rocky slope not far above the valley bottom at 2400m altitude, growing with *Rebutia tuberosa*, but not accompanied by any other species of *Parodia*. The closest-growing species of *Parodia* which I found in this area occurs about 40 km downstream of this location, namely *Parodia procera* FR 742. At this location, *P.procera* grows in large numbers, whilst at the location of *P.subtilihamata*, the population consists of only a few plants and the habitat area is very small (only a few square metres). It is quite possible that *P.subtilihamata* occurs elsewhere in this area in other populations, but searching for them in this deeply fissured, rocky terrain is extremely difficult."

**A VISIT TO CULPINA** From A.B.Lau  
**US Cactus & Succulent Journal Vol.61**

At San Pedro we leave the main road and turn east towards Culpina. This is *Parodia* land. But there is a difference. Whereas the most common species in the genus, *P.maassii*, has brown spination, here we see from quite a distance that all is white, so the name chosen for this very attractive variety is *albescens* Lau 911. Soon though as we travel higher and further east, it gives way to an even more spectacular *Parodia* which is *P.splendens* Lau 917, contrasting beautifully with the deep red flowers. In cultivation this plant is difficult. The body is quite large and stout, the plants visible from a far distance. Now and then we also saw *Weingartia cintiensis* Lau 916, similar to *W.lecoriensis* but with shorter spines, again a difficult plant to grow and to bloom. All these *Weingartias* have napiform roots and need much time to recuperate after disturbing.

High above Culpina we searched for *Lobivia pugionacantha v.culpinensis* Lau 919, again this has deep roots; the spination is unique, the plants readily distinguishable from anything else in this genus. Together with



this *Lobivia*, and deep in the ground, the black central spines visible on the flat area where it grows, we spotted dark red flowers. Finally, after a long search, we had encountered the habitat of *Parodia subterranea* Lau 914.

One of my most important plans in that region was the search for *Parodia procera* Lau 912. Certainly I did want to visit that area as I had been told that only F.Ritter of all cactophiles had penetrated so far. As a point of orientation I had the name of Challamarca. People told me it would be somewhere in the vicinity of Salitre. The trip there was not difficult, and we found large numbers of *Parodia culpinensis* Lau 913, plants that grew cylindrical, similar to *P.maassii*, but with spines that had black points, otherwise greyish, the flowers being the same as *maassii*. On the trail towards Challamarca I enquired whether the distance would be far. In typical understatement the Quechua indian replied "just around the corner". We left the car; we walked, and walked, and walked. When again an indian came up from the chasm below, he also told me it was very close, but pointed to the bottom of the canyon, and then I realised that it was still a very far distance. Yet I had passed the point of no return and with determination I pressed on. Just before descending to what looked like an abyss, I spotted on the right some gorgeous *Parodias* of which I have never read a publication, nor had I ever seen a photo of it. After careful examination it turned out to be *Parodia subtilihamata* Lau 900, honey-yellow spined and with a dark orange flower. I was on the trail of F.Ritter; he had collected this species when he descended to discover *P.procera*. The downward trail seemed never to end. The night would soon fall on us. Finally we reached the bottom; after finding our way through a sugar cane field we eventually found a hut in which we were given a place to sleep. By the early morning light we found a few plants of *P.procera* Lau 912. There is an interesting sequence in *Parodia comosa*, *P.miguillensis*, *P. borealis*, and *P.procera*. All grow in slate, the spination is practically the same, and the flowers are very similar. so I tend to consider them forms of each other, despite the long distance separating *P.borealis* and *P.procera*. The climate is also the same. *Parodia echinus* should also be considered to belong to this group.

### **RECOLLECTIONS OF CULPINA From F.Vandenbroeck. From Succulenta 74.4.1995**

On the following we day we set off on foot in the direction of Cueva, another very authentic Bolivian village. We then walked quite a distance down the valley in the direction of the R.Challamarca/Pilaya. From the deep gorge lying in front of us continuous vapours arose as if from a boiling kettle. It was a remarkable phenomenon. In the late afternoon the vapours became thicker and on the walk back to the pass, Cueva had become completely invisible, enshrouded as it was in dense fog. We were becoming rather disturbed because we still had several hours to walk and we thought that the fog would overtake us before we got back to Salitre so that as a result we might lose our direction. Once over the pass however the mists seem to cling to the summit and only a narrow tail of mist managed to stream into the Culpina basin. These vapours must be a constant phenomenon and this moisture may explain why the cacti are comparatively scarce on the eastern slopes.

.....from J.Brickwood

I would be inclined to agree with the observation by Lau that *Parodia miguillensis*, *comosa*, and *borealis* are probably only varieties of one taxon. However, *P.procera* does not appear to me to fall within this group; it is not a member of the *Obtextospermae*, and may be more closely associated with *P.subtilihamata*.

.....from H.Middleditch

The communication from Ritter reported (above) by Weskamp indicates a site for FR 741 "not far above the valley bottom" at 2400m, which may be compared with "far above the valley bottom, at 2400m" for FR 741 in Englera 16. The foregoing account by Lau would suggest that he found his Lau 900 *Parodia subtilihamata* well above the valley bottom - "Just before an abyss we spotted *Parodias* .... [then] .. the downward trail seemed never to end". Then right in the valley bottom they found Lau 912 *Parodia procera*. Reference to the 1:250,000 Instituto Geografico Militar La Paz maps would suggest that the Rio Cambalaya/Pilaya crosses the 2000m contour less than half way from Villa Abecia to Challamarca; it also appears to cross the 1500m contour line some way before reaching Challamarca. This would suggest that the valley bottom near Challamarca lies roughly a hundred metres or possibly more below the 1500m mark. In turn, this might suggest that the first *Parodia* found by Lau on the descent from Cueva, which he identified as *P.subtilihamata*, may not have been far away from Ritter's 2400m altitude for his earlier find of *P.subtilihamata*.

A number of years ago an extensive review of *Parodia* was received from F.Brandt in which there was a reference to *P.pseudoprocera* Brandt and to *P.challamarcana* Brandt, both names attributed to Challamarca as the finding place.

.....from F.Brandt

***Parodia challamarcana* Brandt.** This species stands close to *P.pseudoprocera*, but is basically different in certain really specific characteristics. Thus the ribs lack any visible tuberculation, they are high and sharp-edged, somewhat spirally arranged. The spination is much longer and stronger. In particular, the seed displays the complete difference of this species to the other two closely related ones, since there is not one similarity between both these species.

Here I must make some additional comments about this finding place Challamarca. The Rio Challamarca discharges into the Rio Camblayo and for the last 20km before this junction the river is a dry bed. That is to say, that the river only flows full of water in the rainy season and hence only in this season flows as far as the Rio Camblayo. In the dry season the water percolates into the ground some 20km prior to the junction with the

Rio Camblayo so the last section of the river bed is completely dried up. This last 20km of the river bed is in a deep gorge, in which the river wanders from side to side. Consequently there is a great area of ground around the mouth of the Rio Challamarca. In addition to this must be considered the valley sides of the Rio Camblayo in the vicinity of the junction, which are even higher and more inaccessible than those of the R.Challamarca. There is thus a great area of ground in the vicinity of the junction of these two rivers in which *Parodia* will be still further dispersed.

In addition, the place called Challamarca lies on the south side of the Rio Camblayo opposite to the outflow from the Rio Challamarca. Consequently the question arises, whether both recent Uhlig importations stated to be from the habitat "Challa Marca" originate from the Challamarca valley or from the place of the same name.

.....from R.Gooch

Fortunately I have plants of *P.procera* and of *P.subtilihamata* in my own collection. Both of them were acquired about nine or ten years ago from T.Jenkins, probably as seed-grown plants. Standing the two sorts side by side, they certainly do appear to be dissimilar. However, as *P.subtilihamata* has more ribs and more radial spines, so it gives the impression of being a more spiny plant. It is 16cm high, 11cm across (over the spines), a mid- to dark- green body with 16 somewhat spiralling ribs having areoles some 10-11mm apart. The areoles are about 6mm by 4mm with short whitish wool; radial spines about 20, thin, 8-10mm long, glassy white, tipped brown, stiff and straight. There are 4-6 or more centrals, stronger than the radial spines, light brown, at least one curving slightly at the tip, up to 20mm long. The flowers are small, orange-red in colour.

The *P.procera* at 13cm high by 7.5cm across the spines, is the narrower of the two sorts for its height and although it is the smaller of the two plants, both the radials and centrals are thicker, that is, more robust. The *P.procera* has a dark grey-green body having 13 somewhat spiralling ribs with areoles some 7-8mm apart, areoles about 6mm by 4mm with short white wool. Radial spines ca. 10-12, 8-10mm long, thin, white, tipped brown, stiff, some curved at the tip. Central spines 4, light brown, up to 17mm long, the lowermost the longest and strongest, generally pointing straight outwards, slightly curved at the tip. Flowers small, pale yellow.

.....from P.Down

My attention was drawn to how close together were the habitat locations of *P.procera* and *P.subtilihamata*, and it was only then I realised how similar they were. When they are put together with *P.pseudoprocera*, *P.andreae*, *P.tredecimcostata* and *P.echinopsoides*, there is a tremendous similarity in the whole group. Having seen the variability of a species in habitat, I can appreciate much better the concept of putting them all under one name. Having said that, I would be reluctant to change all my labels without some reference to the former name. Most of my *Parodia* which come within this group are about 9 to 10cm in diameter and I have been growing some of them for upwards of twenty years. The mature plants of *Parodia subtilihamata*, are all in excess of ten years old. They give an overall impression of being densely covered with honey coloured spines, because they have orange to golden centrals from areoles with white radial spines. I do grow my plants hard i.e. slowly. One of the *P.tredecimcostata* must have some particularly good compost because it is much more open than the others - the valley between each pair of ribs is not covered by the spines.

My plants labelled *P.procera* have much shorter spination than the species mentioned above and because of that the spines at the growing point are not so conspicuous. Although the centrals are a mid-brown when young, the overall appearance of the plant is that it is covered with whitish to cream-coloured spines. In addition I have a plant labelled *P.pseudoprocera* which is also more open growing; it has stronger, dark brown centrals and looks quite distinctive from what one might call the British Standard *Parodia procera*. It was acquired from Westfield in 1985, but perhaps it is something else.

The *P.subtilihamata* and *P.andreae* are, I am sure, one and the same! Ribs 13 in slight spiral, radial spines about 20, 10-15mm long, almost hair-like, golden-brown, central spines 5 to 7, 20-25mm long orange-brown to honey colour, almost straight but with slight curve. Flowers golden-orange 3.5 to 4cm long. The *P.procera* (and *pseudoprocera*) ribs 13 in slight spiral, radial spines 8-12, 7-12mm long, white, mostly straight or occasionally slightly curved; central spines 4, 20mm long, dark brown when young, fading to white, curved.

.....from H.Middleditch

In the 1989 Brandt monograph on *Parodia*, there is a footnote on the page dealing with *P.andreae* Brandt - "Synonym: *Parodia subtilihamata* Ritter"; likewise on the page dealing with *P.echinoides* - "Synonym: *Parodia tredecimcostata* Ritter". Bearing this in mind, the similarities noted by P.Down are perhaps not too surprising. It is noted by Ritter in his *Kakteen in Südamerika* that in K.u.a.S 8.1973, Weskamp wrote that *Parodia andreae* Brandt published in *Stachelpost* 42.1972, was the same as *P.subtilihamata* Ritter. Was the Brandt name a valid publication?

.....from W.Weskamp, *Parodia* -2

***Parodia andreae* Brandt** Synonyms (all based on Ritter FR 741); *P.andreaeoides* Brandt, *P.agalisma*, Brandt, *Parodia subtilihamata* Ritt.

On the subject of which of the four available names is correct, Ritter (*Kakteen in Südamerika* 2.1980) has this to say: "In the conclusion of his article in K.u.a.S., Weskamp (1973) writes that *Parodia andreae* is the same as *Parodia subtilihamata*. I do not intend to question the matter further. I note merely that *P.subtilihamata* should now have priority over the name of *P.andreae*, not the reverse. Publications of cacti which give erroneous or false type locations should not receive recognition."

However, errors of fact in a new description do not automatically invalidate a name under the rules of Botanical Nomenclature. and consequently, *Parodia andreae* Brandt, which meets all the requirements for valid publication, and having chronological priority over the other three names, is the legitimate name for this taxon. *Parodia subtilihamata* Ritt., though perhaps more deserving of recognition, is nevertheless superfluous.

.....from R.Mottram

Dealing specifically with *Parodia andreaei*, Brandt cited a type locality that appears not to have been the collecting site by Ritter i.e. Prov. Mendez, in the mountains WSW of Tarija, possibly near Cieneguillas. So, with the proviso that the actual identities and locations of FR 741 and Brandt's Heidelberg Type specimen are still open questions, we are obliged to accept Brandt's names and types from the standpoint of priority of publication.

.....from H.Middleditch

The account reproduced above from Ritter's "Forty Years' Adventuring" makes it quite clear that his *Parodia subtilihamata* FR 741 was found on the descent between La Cueva and the Rio Pilaya/Camblayo. The river Pilaya/Camblayo forms the boundary between the province of Sud Cinti to the north of the river and prov. Mendez to the south of the river. Hence FR 741 was found in Sud Cinti province, not in Prov. Mendez. Brandt evidently stated the location of this find incorrectly.

.....from F. Brandt Stachelpost 8.42.(1972)

**Parodia andreae.** This species was raised in the 1960's from FR seed, which was offered and kept under the name *subtilihamata*. At that time I had also acquired this species as seeds under this name, but what I describe here was among the 25 seeds that germinated out of one packet of two different sorts. Later I also received such plants as seed and seedlings but under the name of *tredicimcostata*, which likewise were raised from FR seed and were so identified. In addition, I have had seed from Uhlig under the designation "sp.nov. Cieneguillas". The seedlings from this seed sowing have again produced one of the *Parodia subtilihamata* sorts, as well as yet another interesting form. Whilst the confusion with these "*P.subtilihamata*" was still to clarify, in 1970 Ritter brought new seeds of of his *subtilihamata* into circulation and these have now yielded a quite different sort from those of the 1960's. With this description [of *P.andreae*] I will at least today nomenclaturally establish the one "*subtilihamata*" which was sent to me in the 60's, since this appears, on account of the new find from Ritter, to be no longer obtainable. As the finding place for for this new species, it may be presumed to be in the area in the mountains WSW of the city of Tarija, possibly in the vicinity of Cieneguillas, Prov. Mendez. The Holotype is deposited in the Heidelberg University Herbarium.

.....from H.Middleditch

We now know that batches of Ritter's collected seeds were sent to growers in New Zealand who grew on these plants and collected seed off them which were then sent back to Frau Winter, to be offered for sale under the original FR numbers. In all probability this was the real source of the "second collection" of *P.subtilihamata* referred to here by Brandt.

The actual finding place for FR 741 *P.subtilihamata* lies a considerable distance to the north of Tarija, certainly not WSW of Tarija, as stated by Brandt. There is a place called Cieneguillas which lies NNW of Tarija, but again well away from the location of FR 741. The foregoing observations from Brandt concerning the origin of the plants which he used as a basis for describing his *P.andreae*, do seem to make this name rather lacking in credulity. Since Lau 900 *P.subtilihamata* is a well recognised plant with a well recognised name, this can hardly be said for *P.andreae*. In order to avoid yet another confusing change of name, one might prefer to accept the validity of the Brandt name and then ignore it.

#### **PARODIA SUBTILIHAMATA By F.Ritter**

**Translated from Kakteen in Südamerika Vol.2 1980 (Abridged)**

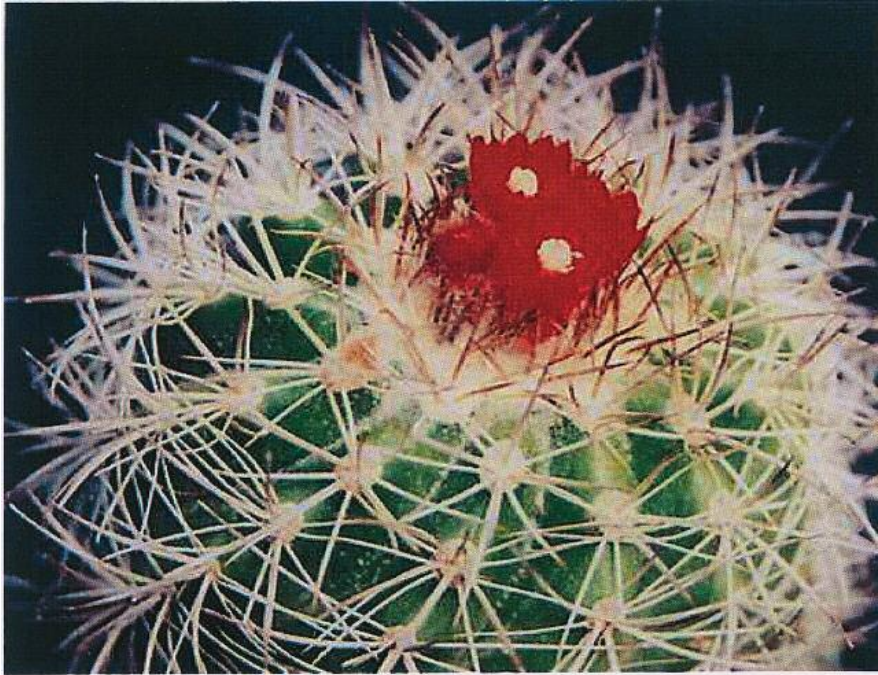
Solitary, globose, 4-7cm diameter, later slightly elongated; ribs 13 (-15) spiralling, markedly tuberculate when young but only faintly so in age, 5-10mm high, blunt, rounded in cross-section; areoles 2-3mm diameter, 3-6mm apart; radial spines hairlike, white, 14-20 of 5-15mm long; central spines needle-like, honey yellow or paler yellow, 4 in a cross, often 1-2 more above them, the lowermost 10-20mm long, always hooked, directed somewhat downwards, the others straight and 7-20mm long. Flowers ..... petals golden yellow at the margins and carmine below, conveying at a glance a somewhat orange-red colour.

#### **PARODIA PROCERA By F.Ritter**

**Translated from Kakteen in Südamerika Vol.2 1980 (Abridged)**

Body green, 3-5cm thick in habitat becoming elongated and in age 30 to 50cm long. Ribs usually 13, rarely 10, tuberculated when young, later without notches 7-12mm high; areoles 2.5 to 5mm long by 2 - 4mm broad, projecting, 3-10mm apart, white- to brownish- felted, not going naked in age. Radial spines needle-like to hairlike, white with or without brown tip, 8-11 of 7-15mm long, straight or very nearly straight, directed sideways or half outwards, around the areole or absent above; central spines 4 in a cross, of which the three upper ones can almost have taken the place of radial spines, the fourth and downward pointing is stronger than all the others, chestnut brown at first going grey much later, 15-20mm long. A peculiar characteristic of this lower central spine is that from one plant to another, there are all transitions from extremely hooked to straight. The three upper central spines are straight or somewhat curved, thinner, but just as long and similarly coloured. Flower ..... petals ochre yellow above, more lemon-yellow below.





**Parodia  
pilayensis  
KB73**

Photo:- K. Beckert

**Parodia  
pilayensis**

Photo:- L. Diers  
K.u.a.S 57 (11) 2006



**Parodia  
subtilihamata  
LAU900**

Photo:-  
J. Brickwood

.....from H.Middleditch

Ritter notes that his diagnosis of his *Parodia procera* was first published in K.u.a.S No.11.1971, whilst the Brandt pseudoprocera was first published in K.u.a.S. No.7.1970, with *P.procera* Ritter as a synonym. Ritter then observes that Brandt is "considered one of the most knowledgeable on Parodias", after which he occupies three and a half pages going through like features of both descriptions in the finest detail, with the objective of demonstrating that the two are not synonymous. As a demolition job, this example must rank among one of the best. Unfortunately, if the Brandt description of *P.pseudoprocera* is valid then we are faced with yet another annoying change of name. Since the Ritter name of *P.procera* is fairly widely known, it would be preferable to recognise the validity of the Brandt name and then ignore it.

**A SPOT OF RED COLOUR IN THE STREAM By R.Hillmann**  
**Translated by H.Middleditch from K.u.a.S. 49 (1) 1998**

In 1992 a field trip was undertaken in the southern part of Bolivia, including the Department of Tarija. Here we planned to go down towards the deep canyon of the Rio Pilaya. This whole area is especially interesting, as according to the geographical location, the widest differences of microclimate prevail. The whole area to the north of the city of Tarija is distinguished by a dry climate. This originates primarily on account of the rain shadow to the east of the mountains running north to south which obstruct the passage of the moisture bearing winds.

Going northwards, (from Tarija) the valley floors rise gradually from 1800m to around 2800m. On the stony places exposed to the sun, *Lobivia tiegeliana*, *Echinopsis obrepanda*, and *Sulcorebutia pilayensis* can be observed. These lines of stony hills are drained by small rivers which in the course of time have cut their way down deeply into the rocky ground. At somewhat shadier spots here, a quite different group of species can now be observed. Where moisture is present there firstly appears orange flowered *Begonias*. The rocks are colonised by various forms of *Aylosteria* e.g. *R.fiebrigii*, *R.muscula*, and - more rarely - *R.tarijensis*.

We stopped besides a particularly idyllic river bank above which we erected our tent for the night. When refilling our water canister with the glass-clear water, our attention was attracted by some white balls on the slabs of rock, which appeared to us to be an unknown *Parodia*. Since it was slowly growing dark, we left the real examination of the various cacti here until the next morning.

In the night there was a violent thunderstorm and the small stream rose to a rushing torrent, making a great noise. Already at 6.00 a.m. however the sun came out and we could set off on our investigation of the flora. It then transpired that the *Parodia* grew exclusively on huge grey slabs of rock which were sparsely interspaced with soil. As for the other plants, some grass, herbs, and lichen could be noted. The lichen had partially occupied the lower part of the *Parodias*. The water level in the stream had got near to the nearest *Parodias* and it appeared to be quite possible that some of these plants stood partially, even briefly, in the water and so with time might even have been uprooted by the water.

We spent the rest of the day in the wider surroundings of this area, but we saw no further growing places. A campesino, whom we met on the road, told us that on his estancia that lay round our finding place, such plants would occur and the men had called the plants "Rosarios". On that account this discovery was given the provisional name of *Parodia rosarioana* n.n.

This habitat location is at 2800m. Nothing was found in the course of the search of the references at my disposal, of any corresponding description or a relationship. Then next I considered possible habitat locations quoted in field records, and Type locations. Here, the northerly area around Culpina comes into question as well as the rather deeper river valley of the Rio San Juan del Oro between La Carreras and Camargo. These areas have been travelled by myself and I found nothing there that corresponded to the *Parodia rosarioana*.

From a habitat nearest to these plants there comes *P.occulta* Ritter at Cana Cruz, *P.tredecimcostata* Ritter from Rio Pilaya, and *P.gracilis* Ritt. at Alto Espagna. However, in body form and flower these are readily distinguishable from *P.rosarioana* n.n. In addition the author was able to locate *P.gracilis* at the Type location on an earlier field trip.

.....from H.Middleditch

The altitude at which this *Parodia* was found, together with the picture of the plant provided by R.Hillmann, would suggest that it was not the same as the *Parodia pilayensis*. The location may be no great distance from the place of the name Rosai - see Cinti valley map.

**PARODIA PILAYENSIS - A NEW SPECIES FROM BOLIVIA. By L.Diers and K.Beckert**  
**Translated by H.Middleditch from K.u.a.S. 57 (11) 2006**

The plant described here was given the provisional name of *P.pilayensis* by Beckert in 2001. Surprisingly it was found in an area already searched long ago, from which - since the discoveries of F.Ritter - only *Parodias* of a really imposing body size with large yellow flowers were known. So it appeared to be worth while to write about its discovery. As the basis of our observations we have concerned ourselves with plants raised from habitat collected seed. In the meantime additional information on the distribution area of these plants in habitat was established, so that we are now able to describe the discovered *Parodia* populations as a good species on the basis of the recorded observations. The more so as in more recent times other field explorers have found this new species in the designated area.



As the nearest relatives there comes into the picture *P.procera* Ritt., *P.tredecimcostata* Ritt., and its var. *minor* Ritt. which Brandt described as *P. separata*. This last-named species displays such a degree of agreement with *P.procera* that there is the possibility of their being synonymous.

(Full description given, comparing various details with *P.procera*). Habitat - on slopes to the south of the Rio Pilaya at 1500-1900m. Occurrence - found in the north-east of Prov.Mendez, on the mountain slopes falling down towards the Rio Pilaya. Four populations were observed in a stretch of about 10km, between which no consistent differences were to be observed between the individual populations. These plants grew preponderantly in loamy erosion material from the red sandstone, between inclined plates of rock, in company with *Gymnocalycium pflanzii*, a *Trichocereus* species, as well as the numerous Bromeliaceae intermingled with low growing bushes.

In the whole region, from the SE part of the province Sud Cinti with *P.procera*, further E into the Prov. Mendez with *P.tredecimcostata* and its v.*minor*, also further south from there in the same province at higher altitudes with *P.gracilis*, up until now exclusively yellow flowering *Parodia* have been described. Hence the fully detailed description here of the intensively red flowering, small growing *Parodia* is particularly noteworthy since it occurs at relatively low altitudes within this area which have a warm climate, as a distinctive interloper. The nearest well known *Parodia* with similar deep red flowers, but with a very different appearance, are to be found much further to the SW, W., and NW and all at considerably higher altitudes, more or less in the direction of Iscayache (*P.maassii*, *P.suprema*), further towards El Puente (*P.ritteri*), up towards Camargo (*P.camarguensis*), as well as in the vicinity of Culpina and Salitre (*P.culpinensis*, *P.subterranea*).

On account of the flower colour and the distribution area, there comes into question the relationship with the as yet still not validly described *P.rosarioana* R.Hillmann. These *Parodia* were found by K.Beckert at almost the same time and recorded under the numbers KB 72 and KB 163, and also later by W.Krahn.

.....from J.Brickwood.

I do have a number of seedlings of *Parodia pilayensis* of flowering size - ex K.Beckert - and would agree that they are most closely related to *P.procera*, at least descriptively. There is a dearth of genuine *P.procera* material in cultivation, the same with *P.subtilihamata*. To my knowledge, nobody else has yet followed Lau or Ritter's long trek down into the Rio Challamarca and either observed or re-collected either species and I am not convinced that I have ever seen any genuine material of *P.procera* in cultivation. Even though a lot of seed suppliers have provided any number of *Parodia* under both names in the past. Weskamp was of the opinion that *P.subtilihamata* never even entered into cultivation from either Lau or Ritter, but I believe that Lau 900 was distributed fairly widely in the late 70's and 80's from seed.

*Parodia tredecimcostata* is somewhat similar to *P.subtilihamata*, but smaller, with fewer ribs, a lighter green epidermis, shorter and fewer and more rigid spines. Again, it is possibly part of the *P.procera* complex. But I believe that *Parodia rosarioana* is something else entirely and probably warrants publication as a new species, moreso than *P.pilayensis*.

.....from H.Middleditch

The description of *P.pilayensis* by Diers and Beckert refers to this plant being found at an altitude of some 1500-1900m on slopes to the south of the Rio Pilaya. It appears that this location would have been reached by following the same route as that taken by R.Hillmann, i.e. going north out of Tarija, as the terrain in this area affords little in the way of choice of access to the Rio Pilaya valley. This route reaches the R.Pilaya no great distance from Challamarca, which lies on the opposite bank of the river and so would tend to confirm the estimated altitude of 1500m for Challamarca, quoted above. It was well above Challamarca, at some 2400m altitude, that Ritter found his *P.subtilihamata* and Lau found his Lau 900 which appear to be one and the same species.

It is observed by Diers and Beckert that "from this area exclusively yellow flowering *Parodia* have been described" thus overlooking the orange-flowering *P.subtilihamata*. One is therefore left to question why these authors failed to take account of that name. What conclusions are to be drawn from looking at the adjoining pictures of Lau 900 *P.subtilihamata* and *P.pilayensis*?

.....from J.Brickwood

The *Parodia* Lau 900 *subtilihamata* and *P.pilayensis* in the accompanying pictures may appear to be superficially similar to each other, but when my plants of these two species are placed side by side in the greenhouse, there is no difficulty in telling them apart. In addition, not only does *P.subtilihamata* grow to a far larger size at maturity than the *P.pilayensis*, but the flowers on *P.subtilihamata* are much larger than those on *P.pilayensis*. I am inclined to believe that, despite this, they are both related to the *P.procera* group.

As to *P.rosarioana*, the spine length is very variable and I have seen this displayed even in tiny seedlings.

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### Slide and CD Library Holders and Particular Interests

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\$ Weingartia	A.Glen, 5 Hall Grove, Macclesfield SK10 2HQ	aglen@tinyworld.co.uk

\$ indicates that a list of slides of that genus is available on request by s.a.e. or E-mail. Numbers of slides per genus vary from a few to a considerable number. Slide quality and species coverage are also very variable. Also available are CD's for Notocactus, Parodia, Sulcorebutia, and Weingartia. Any additions to this library in the form of slides or a CD will always be very welcome

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